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MUNITIONS EXECUTIVE SUMMIT 2010

"The Challenge: Aligning Industrial Capabilities With Munitions Requirements and Resources"

San Diego, CA

8 - 10 February 2010

Tuesday , February 9, 2010

PEO-AMMUNITION, WELCOME AND OPENING REMARKS

- BG Jonathan A. Maddux, PEO-Ammunition

INDUSTRY KEYNOTE ADDRESS - COMMERCIAL INDUSTRIAL CAPABILITIES

- Mr. Dick Hammett, President, Winchester Ammunition

AMMUNITION ENTERPRISE CROSS SERVICE PANEL

PANEL CHAIR: BG Jonathan A. Maddux, PEO-Ammunition

- BG(P) Genaro Dellarocco, Deputy Commanding General, US Army Aviation and Missile Life Cycle Management Command (AMCOM) for Missiles and Space - Program Executive
- BG Larry Wyche, Commander, Joint Munitions and Lethality Lifecycle Management Command
- BG Michael Brogan, Commander, Marine Corps Systems Command
- CAPT Jeff Horton, SC, USN

US ARMY MUNITIONS REQUIREMENTS

- Mr. Don Chrans, USA, G-8, Munitions
- Ms. Sue Carlson, USA, G-4, Munitions
- Mr. Jeff Brooks, ASA-ALT Ammo DASC

TECHNOLOGY DEMANDS ON THE FUTURE INDUSTRIAL BASE

PANEL CHAIR: Dr. Joseph Lannon, ARDEC Technical Director

- Mr. Paul Turner, Acting Deputy Director Weapons Development and Integration Directorate, AMRDEC RDECOM (Research, Development & Engineering Command)

ICAP REPORT

- Mr. Michael Wilson, , President, General Dynamics Ordnance & Tactical Systems

Wednesday, February 10, 2010

US MUNITIONS INDUSTRIAL COMPLEX - READINESS AND RESOURCE ISSUES

- Mr. Bill Sanville, Deputy Project Manager, Maneuver Ammunitions Systems
- Mr. David Puig, Command Sergeant Major, JMC

PM ACQUISITION PANEL

- Mr. Chris Grassano, Project Manager Maneuver Ammunitions Systems
- COL Scott Turner, Project Manager Combat Ammunitions Systems
- COL Raymond Nulk, Project Manager Close Combat Systems
- COL Kim Brooks, USAF
- Mr. Matthew Zimmerman, Deputy Project Director Joint Services

MUNITIONS BUDGET PANEL - Q&A

- Mr. Dick Ladd, CEO, Robison International
- Mr. Dave Armour, Cypress International

Budget Panel

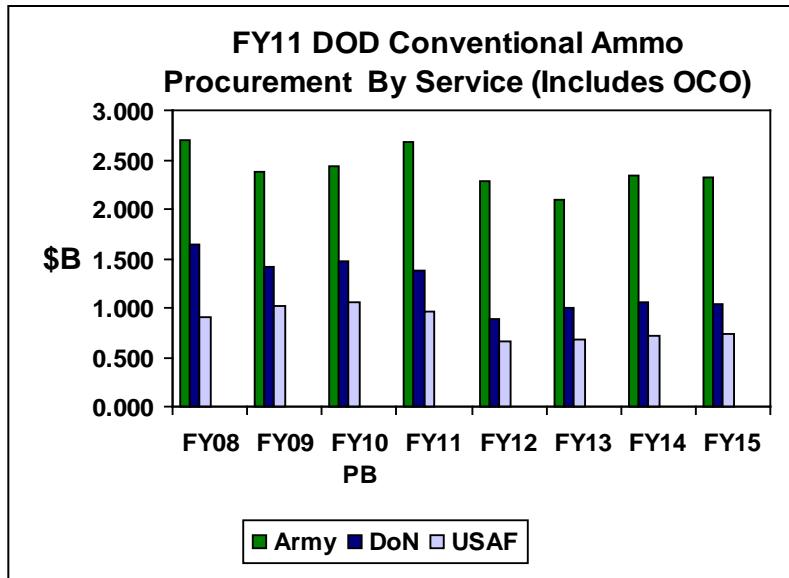
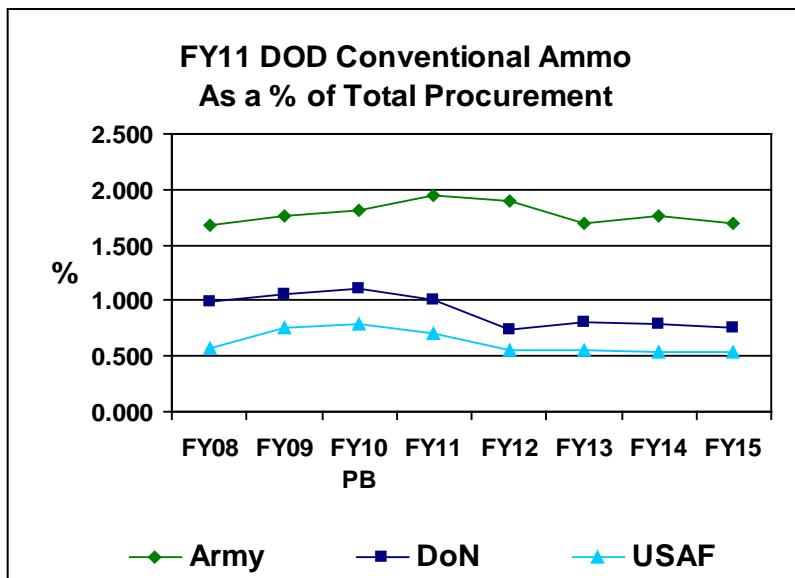
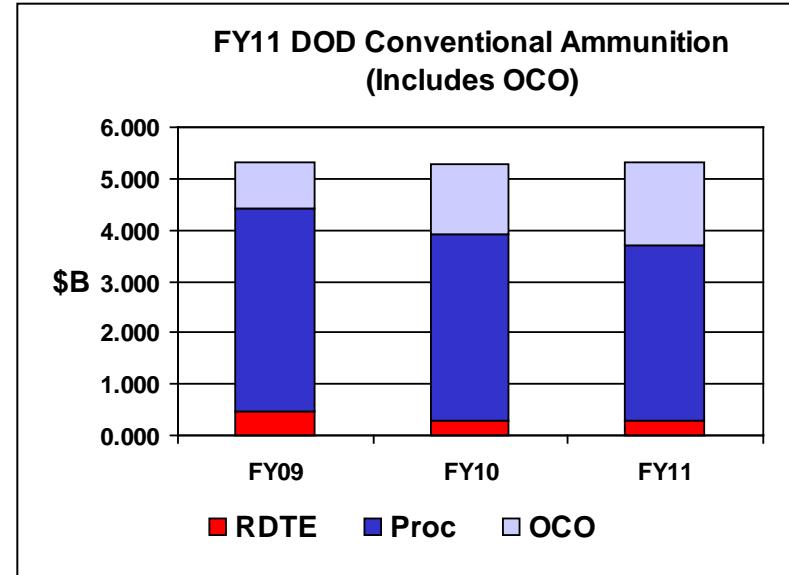
Munitions Executive Summit

Dave Armour
Cypress International

Conventional Ammo Market Environment

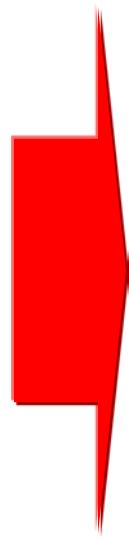
▪ Key Issues

- Funding: overall decline; supplements reduced; R&D reduced
- Few new starts – affordability limitations
- Concerns about precision affordability
- Stated interest in non-lethal options; but few \$
- Mandatory IM
- Eroding industrial base – particularly 2nd & 3rd tier suppliers;
- Army Ammo Plants – modernization, competition, funding



QDR Impacts on Conventional Ammo

Mission Areas Critical to Achieving Objectives
Defend the U.S. and Support Civil Authorities at home
Succeed in Counterinsurgency, Stability, and Counterterrorist Operations
Build the Security Capacity of Partner States
Deter and Defeat Aggression in Anti-Access Environments
Prevent Proliferation and Counter WMD
Operate Effectively in Cyberspace



- **Force structure changes drive requirements**
 - Army
 - Fewer HBCTs; More SBCTs
 - Additional Combat Avn Bdes
 - More UAVs
 - Navy
 - Fewer Carrier Wings
 - Additional Riverine Sqdn
 - Air Force
 - Field Light Attack aircraft
 - SOF
 - Additional fixed & rotary wing assets
- **Implied requirements to support Irregular Operations**
 - Perception that lethality is good enough
 - Non-lethal to lethal options = scalable effects
 - Reduced collateral damage drives precision efforts
 - Concern about affordability
 - Likely AORs = need for improved log spt features
- **Desire to rapidly equip partner nations**
 - Desire to reform export control regimes
- **Industrial base implications**
 - Shifting requirements = shifting volumes
 - Acquisition reform

ARFORGEN

The Current Fight Remains the Priority

QUESTIONS ?



Ammunition Enterprise Cross Service Panel

2010 Munitions Executive Summit

Tuesday February 9, 2010



Panel Chair ~ BG Jonathan A. Maddux, PEO Ammunition



Major General Andrew Busch, Commander – Ogden Air Logistics Center (COL Perry Oaks, Hill AFB, briefing)



BG(P) Genaro Dellarocco, Deputy Commanding General US Army Aviation and Missile Life Cycle Management Command (AMCOM) for Missiles and Space – PEO Missiles and Space



BG Larry Wyche, Commander - Joint Munitions Command



BG Michael Brogan, Commander – Marine Corps Systems Command



RDML James McManamon, Deputy Commander Surface Naval Sea Systems Command and Director, Ordnance Safety (CAPT Jeff Horton, O/EDCA, briefing)





PEO Ammunition

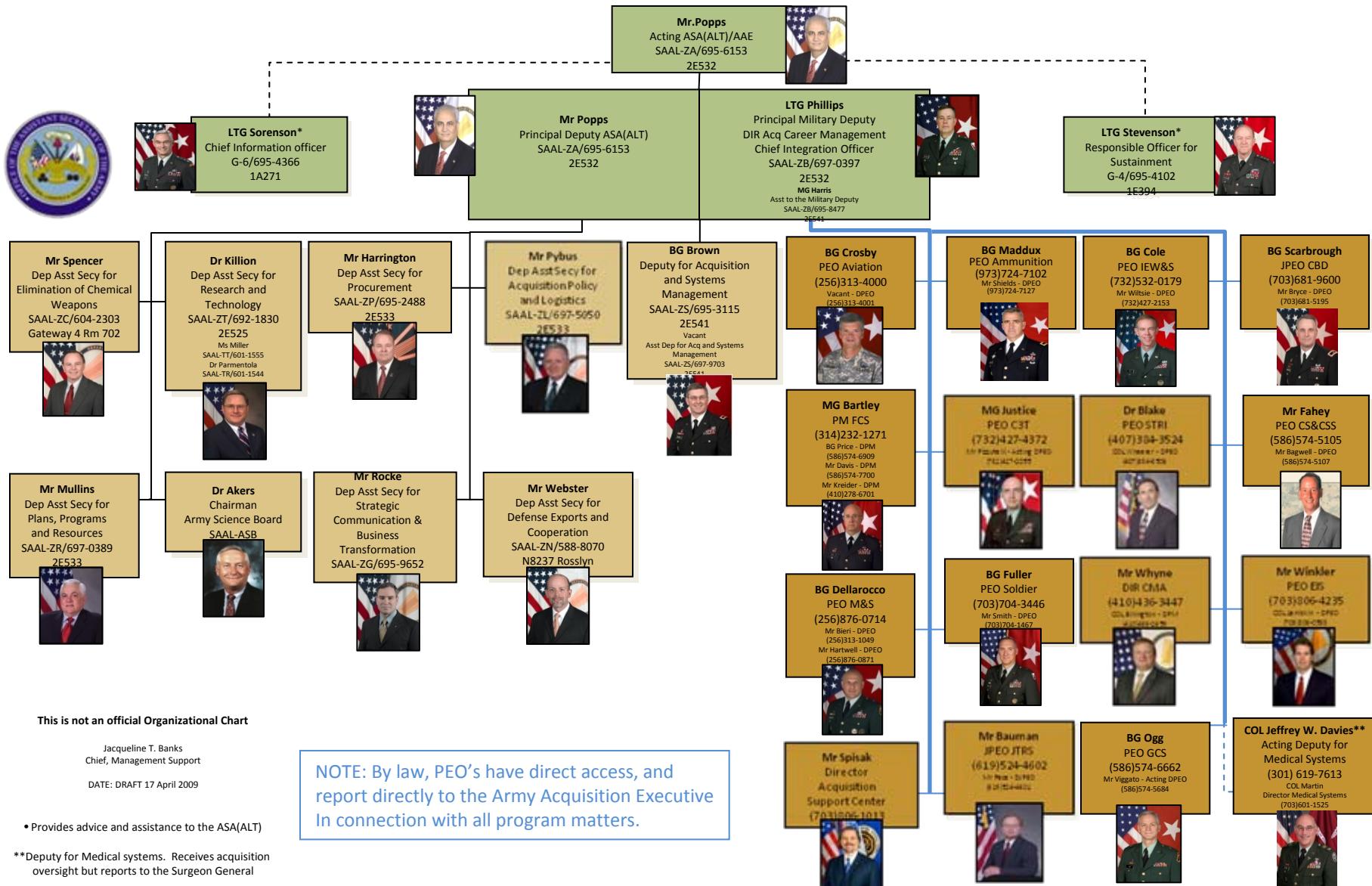
BG Jonathan A. Maddux

2010 NDIA Munitions Executive Summit

Tuesday February 9, 2010



Assistant Secretary of the Army, Acquisition, Logistics and Technology (ASA(ALT))





PEO Ammunition Organization



Project Managers



PM CAS Combat Ammunition Systems

Indirect Fire Munitions and Mortar Weapon Systems

- PM Mortars
- PM Excalibur

973-724-2003

john.scott.turner@us.army.mil



PM CCS Close Combat Systems

Close Battle Systems, Networked Munitions, and Force Protection

- PM Countermeine & EOD
- PM Intelligent Munitions Sys
- PM IED Defeat/Protect Force

973-724-7041

raymond.nulk@us.army.mil



PM MAS Maneuver Ammunition Systems

Direct Fire Munitions

- PM Large Caliber
- PM Small & Medium Caliber
- PM Medium Cannon Caliber
- PD Non-Standard Ammo

973-724-5307

chris.grassano@us.army.mil



PD JS Joint Services

- Ammunition Industrial Base
- Ammunition Logistics
- Technology and Prototyping
- Demilitarization

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O/EDCA Executive Director Conventional Ammunition

- SMCA Assessment

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PD JP Joint Products

- Navy and Air Force Bombs & Energetics



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3
Single Manager for Conventional Ammunition



Ammunition Enterprise Strategic Partnerships



Armaments Research Development & Engineering Center



PEO Ammunition



Joint Munitions Command (JMC)



Acquisition Centers



AMCOM



ASC



Executive Director Conventional Ammunition



CECOM



TACOM



OUSD (AT&L)



Joint Ordnance Commanders Group



Department of the Navy



PEO Integration



PEO Soldier



PEO Aviation



PEO Ground Combat Systems



Navy (Lethality)



Joint IED Defeat Organization



US Army Security Assistance Command



Human Capital TRADOC



Services & Infrastructure IMCOM



US Marine Corps



Department of the Air Force



Defense Contract Management Agency



US Special Operations Command



Supporting the Warfighter





Ammunition Enterprise Cross Service Panel

*Joint Munitions Command
BG Larry Wyche*

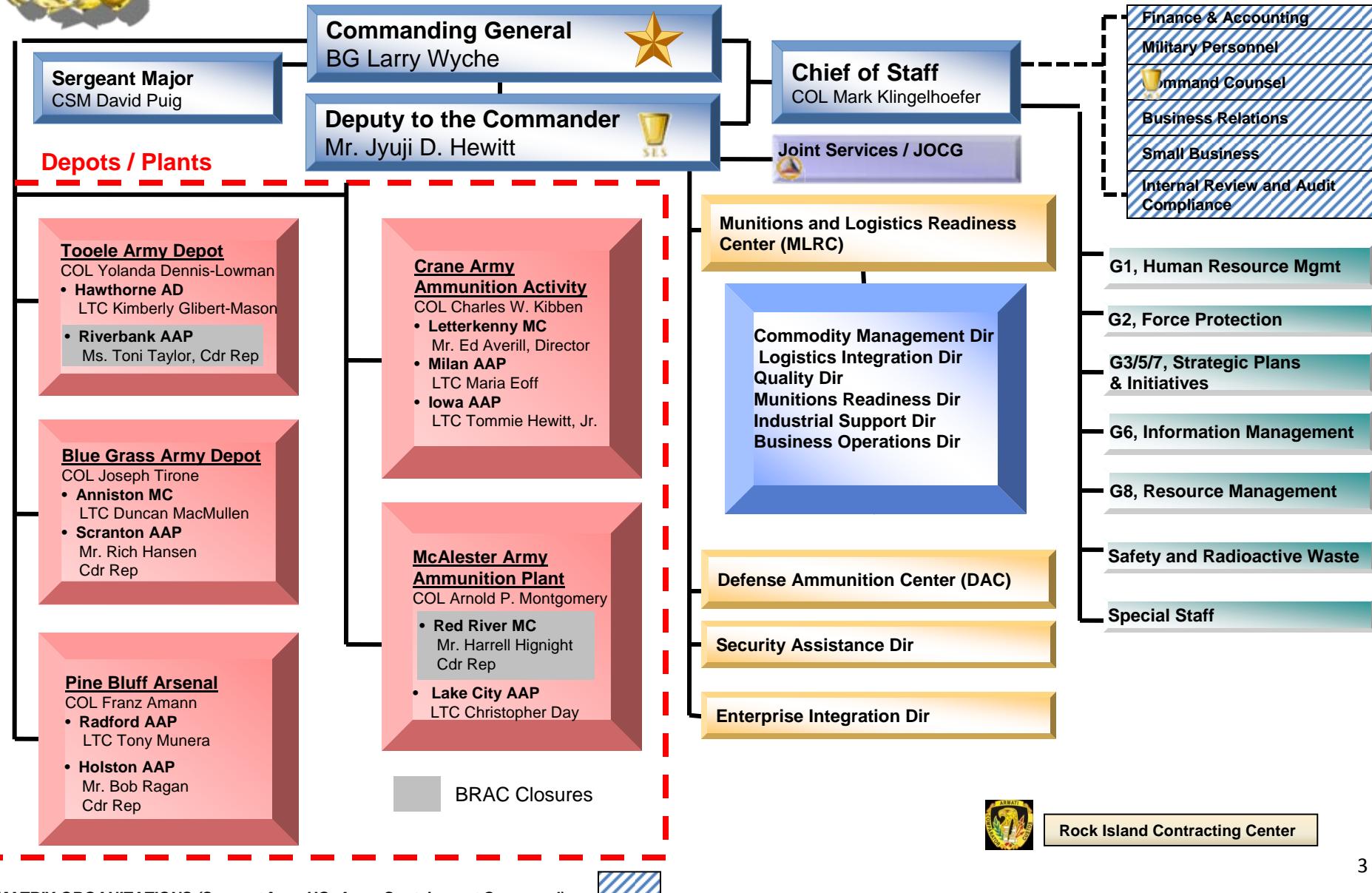


Agenda

- The JMC
- Supporting Contingency Operations
- Retrograde
- Support to Our Allies
- Cross Leveling
- Safety
- Summary

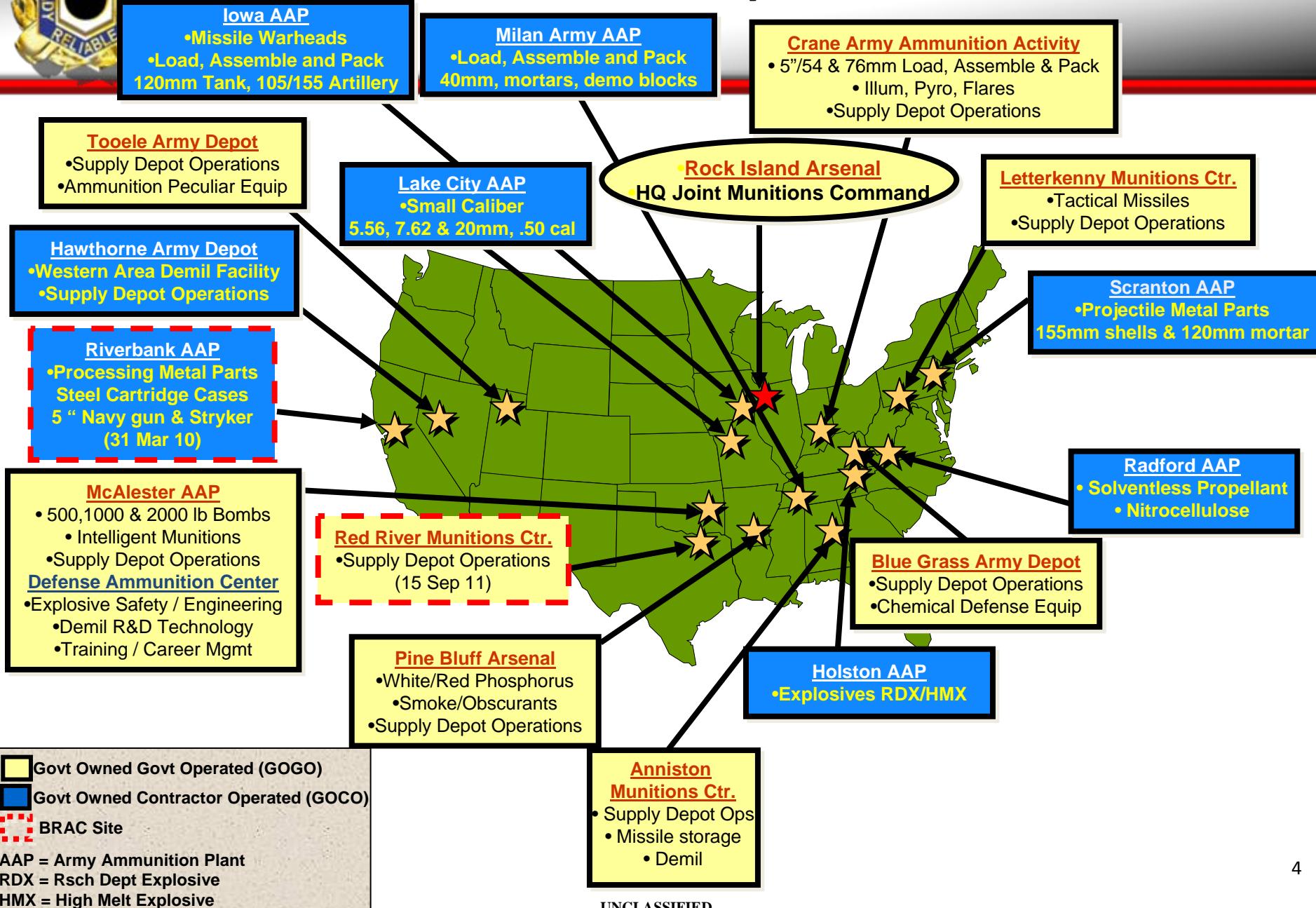


Joint Municions Command (JMC)



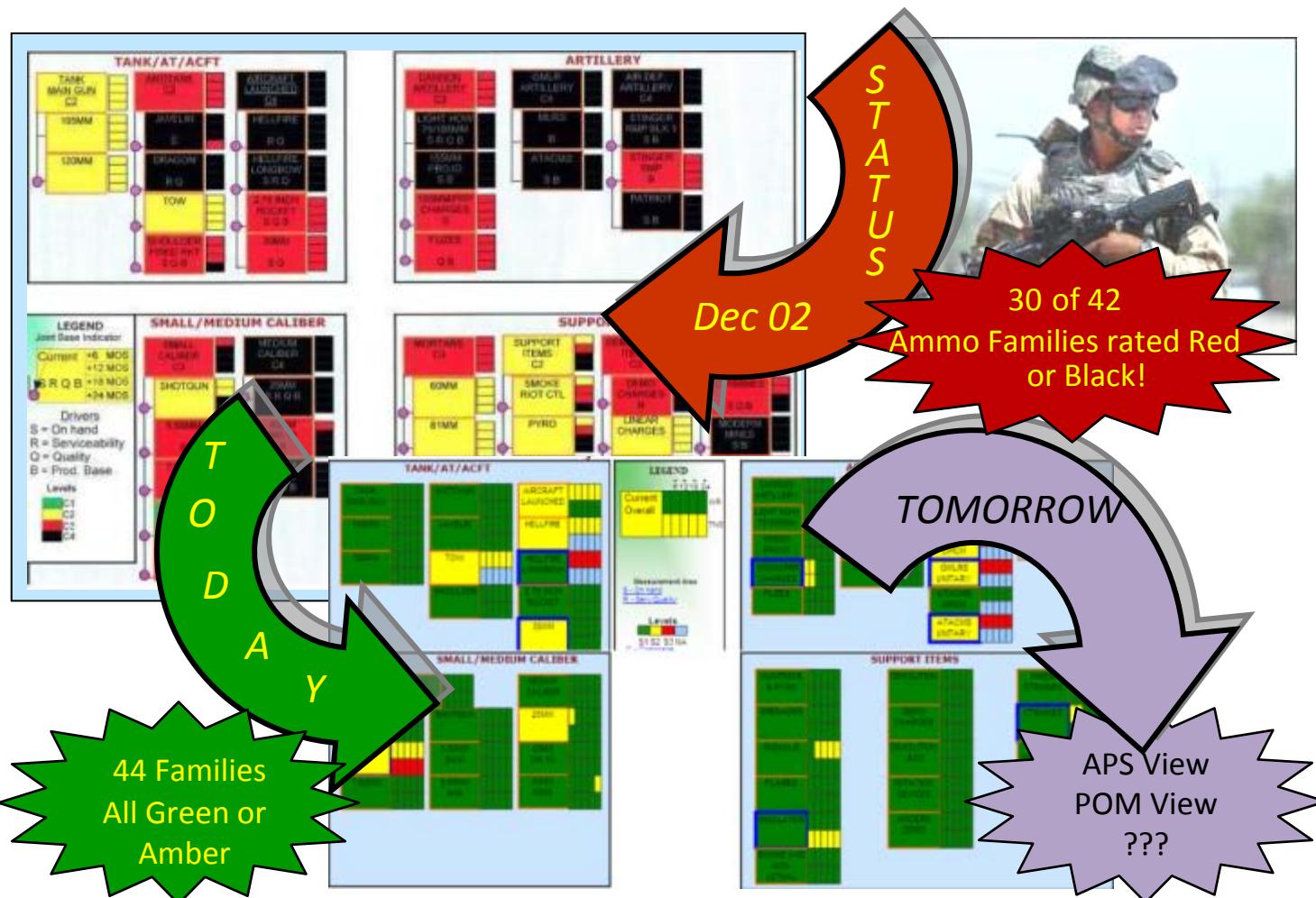


JMC Footprint



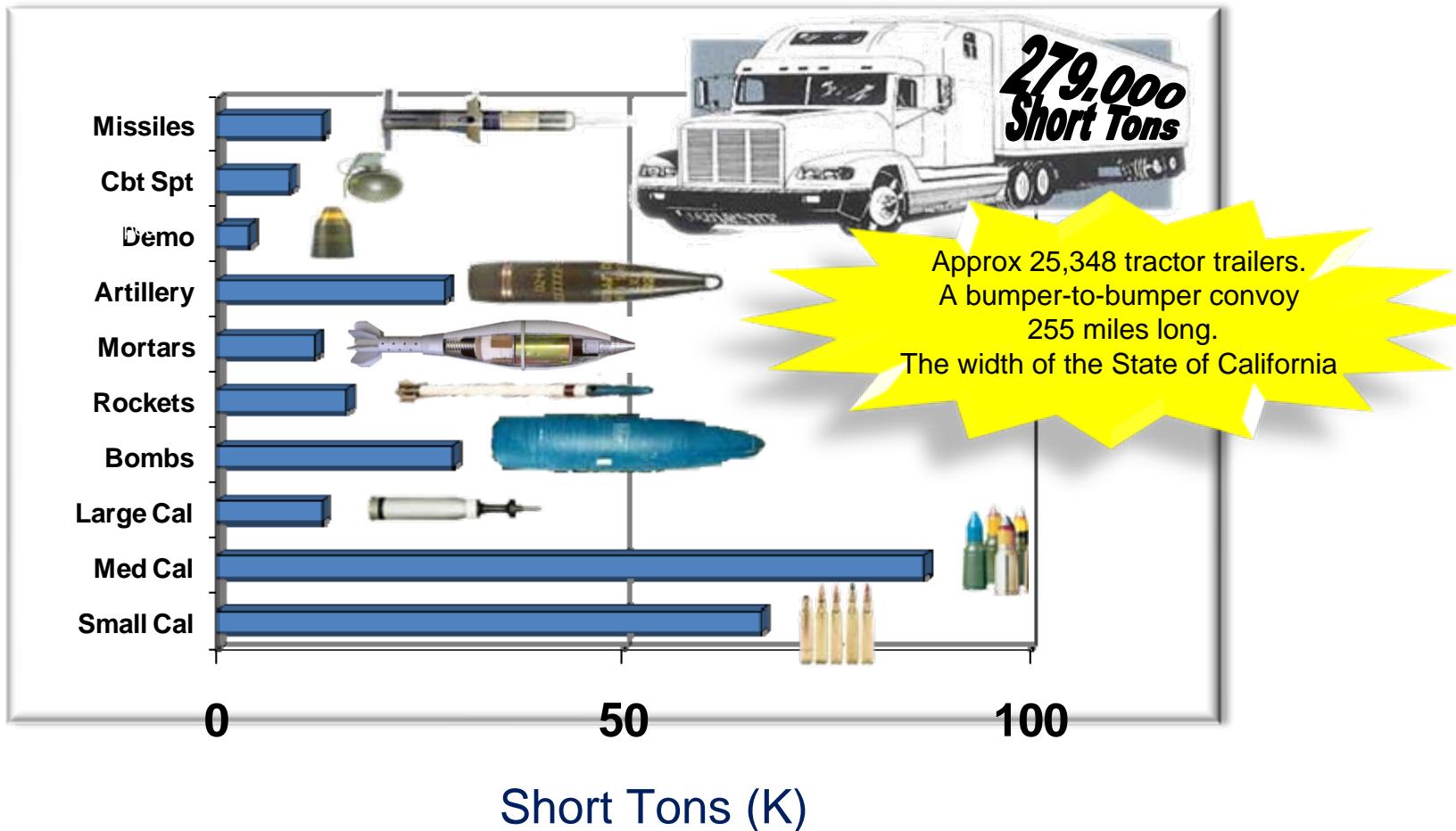


Ammunition Readiness





Supporting Contingency Operations

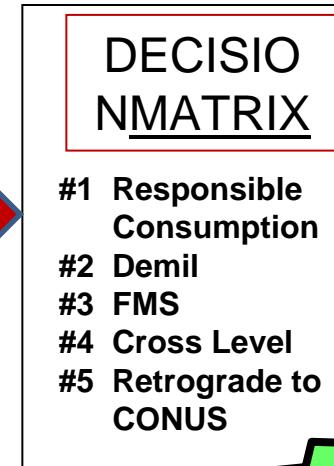




Retrograde

➤ SWA

- Strategy – Minimize what we bring back
- 1,108 containers since 12/07



Data Driven Analysis

➤ Korea

- Strategy – Getting the “right” stocks in position
- FY 09 – 1,525 containers
- FY 10 projected – 2,500 containers





Support to our Allies

Standard & Non-Standard-Ammo – Afghanistan / Iraq

- ✓ Afghanistan – 19 Contracts / \$407M
- ✓ Iraq – 8 Contracts / \$75M

- ✓ Afghanistan Standard Deliveries
 - Sm Cal – 288M rds
 - Med Cal – 561K rds
 - Pyro / Demolition – 770K
 - Grenades – 138K

- ✓ Afghanistan Non Standard Deliveries
 - Sm Cal – 459M rds
 - Med Cal – 2.6M rds
 - Other – 272K





Cross Leveling

➤ Iraq / Afghanistan

- 116 containers, \$37M re-distributed



➤ Between Services – yearly stratification

- FY 09 results – \$38.5M
- Available in FY 10 – \$406.6M (estimated)

➤ FMS / Allies

- From theater in FY 09: \$6.2M. Countries include: Canada, Netherlands, Afghanistan, Iraq and Lebanon
- From CONUS in FY 09 to Countries supporting OEF/OIF: United Arab Emirates, UK, Australia, Canada, Netherlands and France



Safety

Army Ammunition Malfunctions

In 2009, **345** malfunction investigations initiated



207 were ammunition related



73 were due to field malfunctions

Navy: 50
malfunctions

AFFECTS:
Safety
Readiness

Air Force:
109 malfunctions



Summary

➤ BEING RESOURCEFUL

- Meeting Requirements with Cross leveling, Retrograde, in addition to new Production
- Supporting our Allies – helps us sustain

➤ ENSURING AMMUNITION IS SAFE

- 345 Ammo Malfunctions → 207 ammunition related → 73 field malfunctions...too many



➤ WORKING ENTERPRISE SOLUTIONS

Ready - Reliable - Lethal



MUNITIONS EXECUTIVE SUMMIT

Ammunition Enterprise

Cross Service Panel

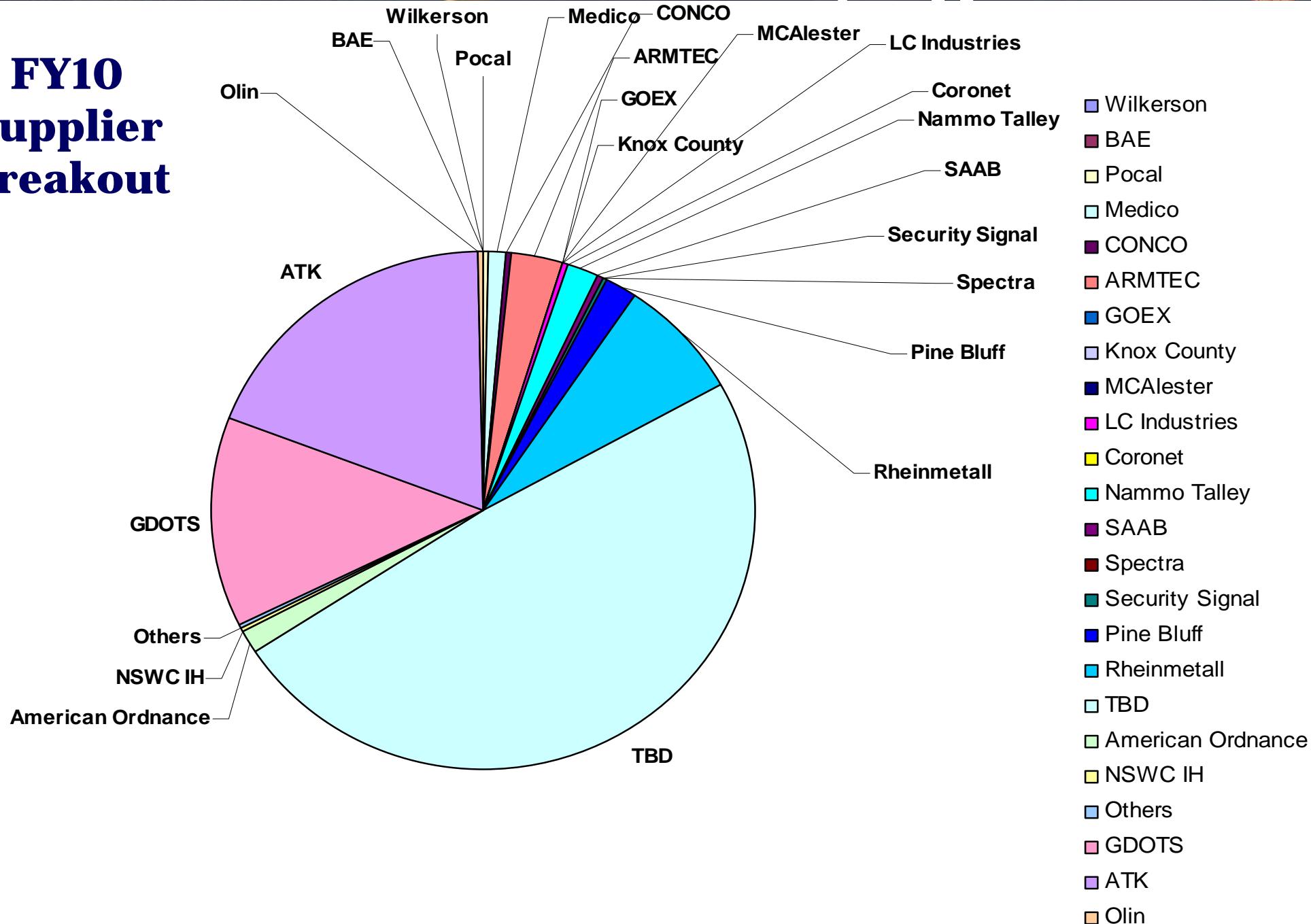
BGen Michael M. Brogan

Commander, Marine Corps Systems Command



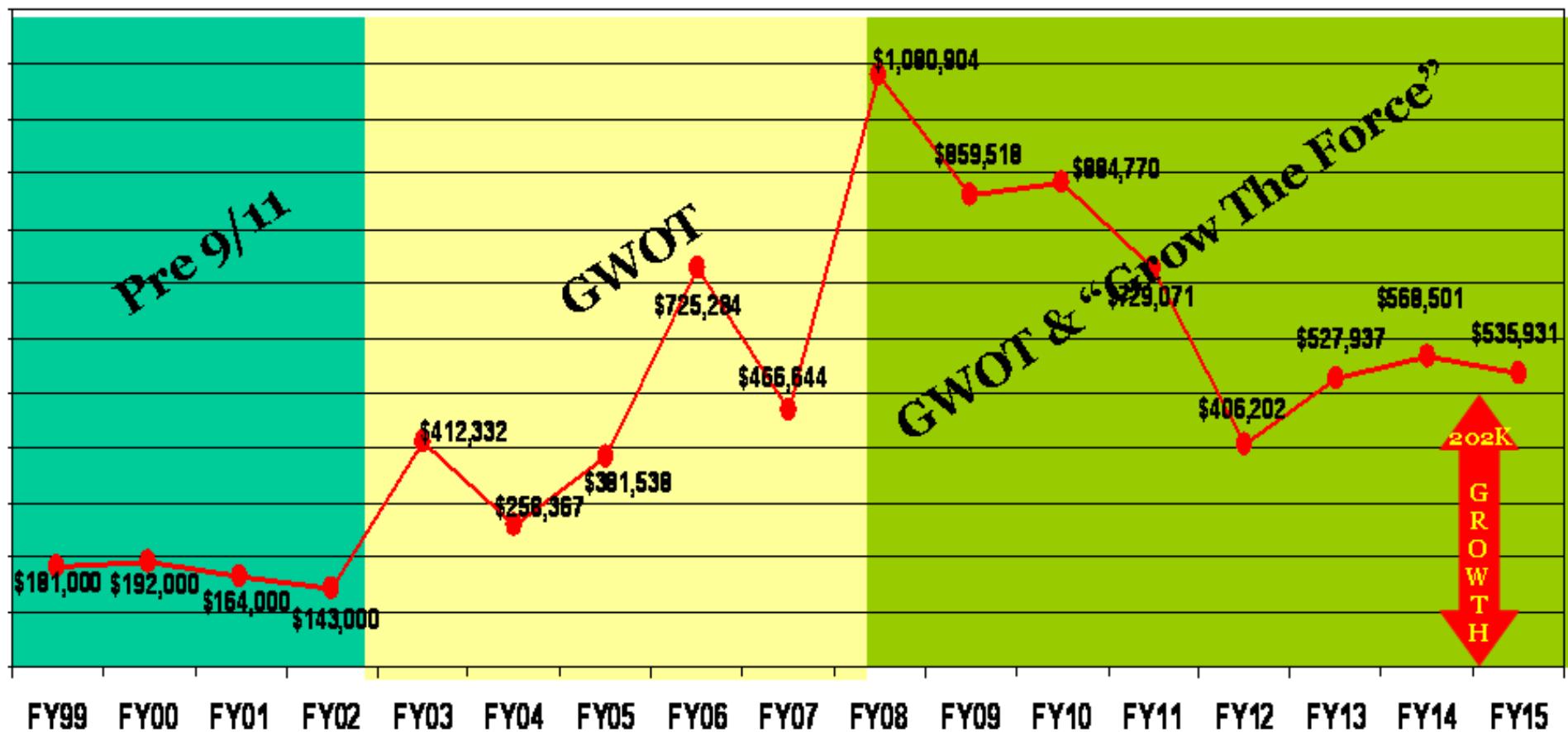
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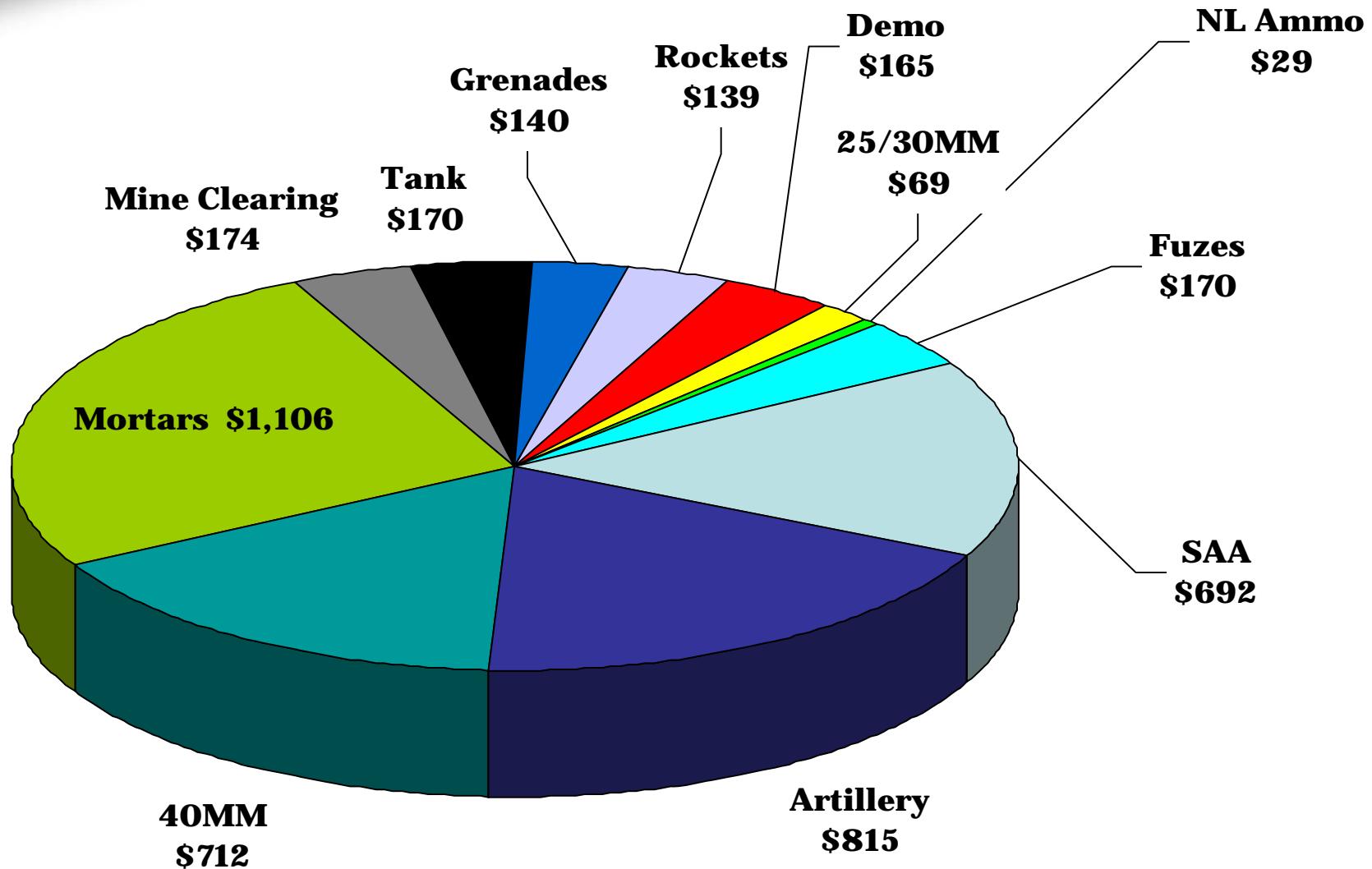
Industry Support

**FY10
Supplier
Breakout**

Total Production Pipeline: 425 Open Orders @ \$2.4B



USMC Ammunition Investment (FY99 thru FY15)





FY09-FY15 Procurement Breakout = \$4.512B
(PRESBUD 09)

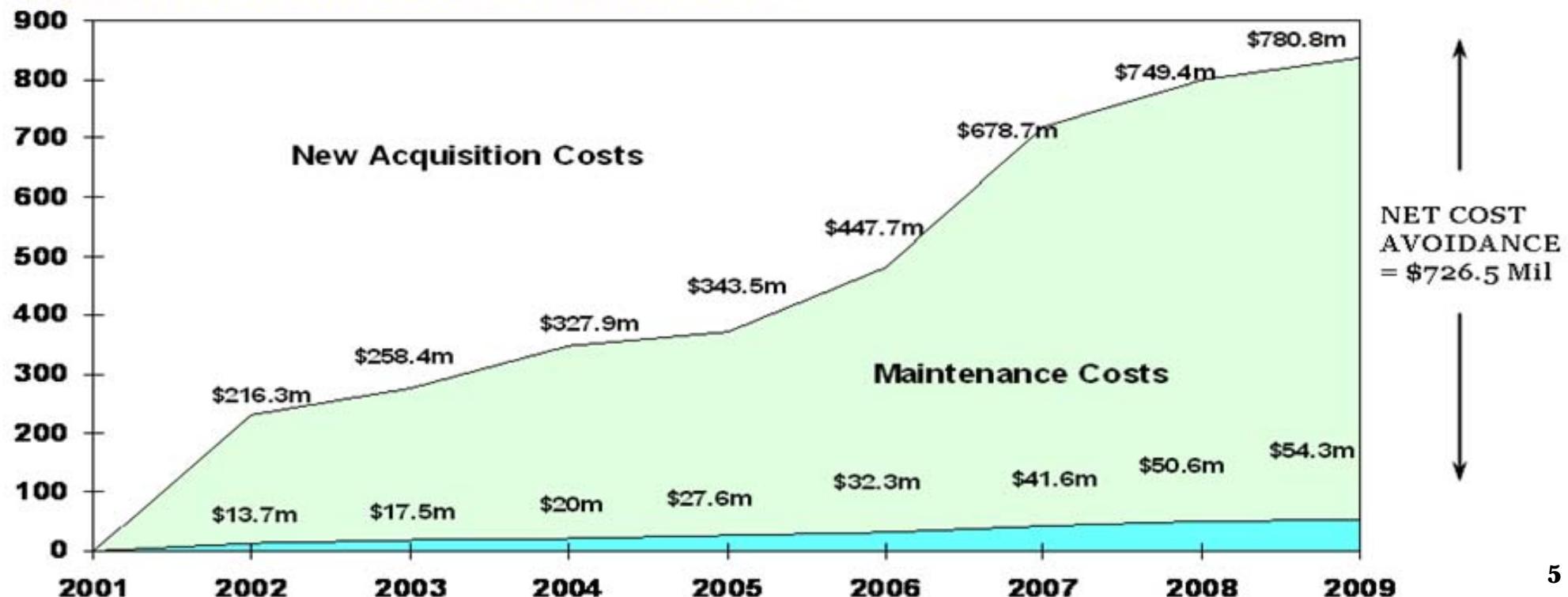


Maintenance & Renovation

“Cost Avoidance”

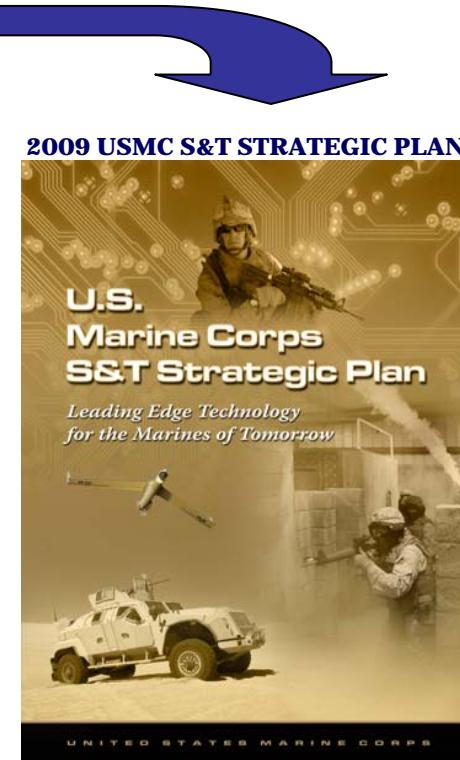


- Significant “RETURN ON INVESTMENT” (ROI)
- Cumulative Return on Investment (ROI).

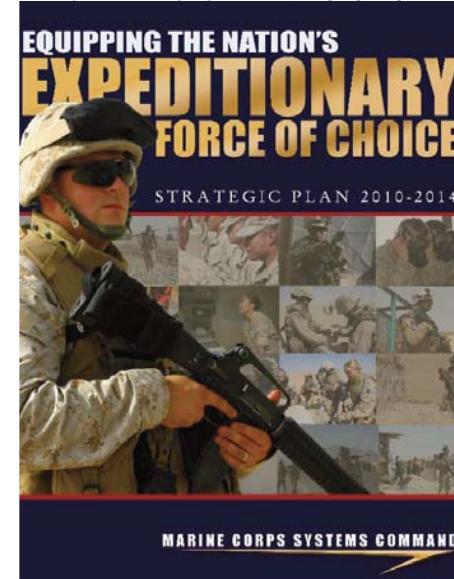




USMC VISION & STRATEGY 2025



MARINE CORPS SYSTEMS COMMAND STRATEGIC PLAN 2010-2014



PM AMMUNITION 2010-2014 CONVENTIONAL AMMUNITION STRATEGIC PLAN





- Cluster Munitions Alternative's
- Landmine Replacement - (SPIDER Networked Munitions)
- USMC Shift to OEF; Precision!
 - Excalibur
 - Precision Guidance Kit (PGK)
 - 120mm Precision Extended Range Mortar (PERM)
- 2 Additional Tank Companies (FY11) + 28 M1A1's
 - 120mm Multi-Purpose - capable of point- or delayed-detonation for anti-materiel application or air burst for anti-personnel
 - Full and Open Competition





- **Shoulder Fired Rockets:**

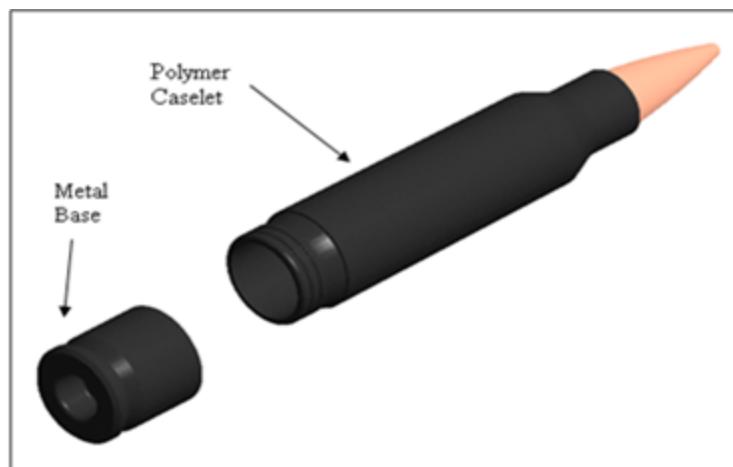


- **Increase M72 LAAW Procurements**



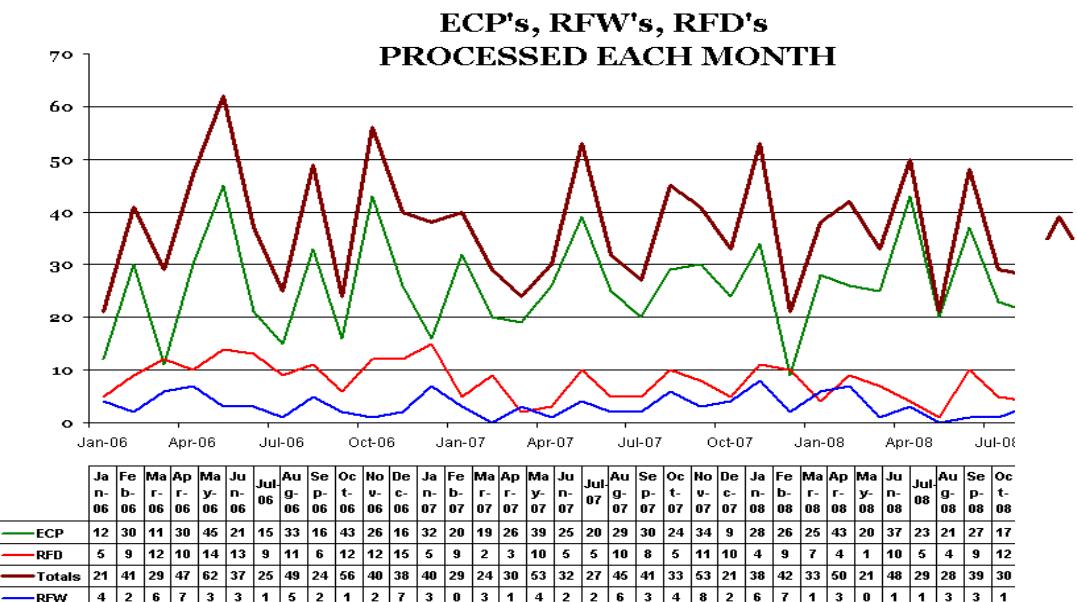
- **SMAW II FFE MP Warhead**

- **Polymer Cased Small Arms Ammunition**

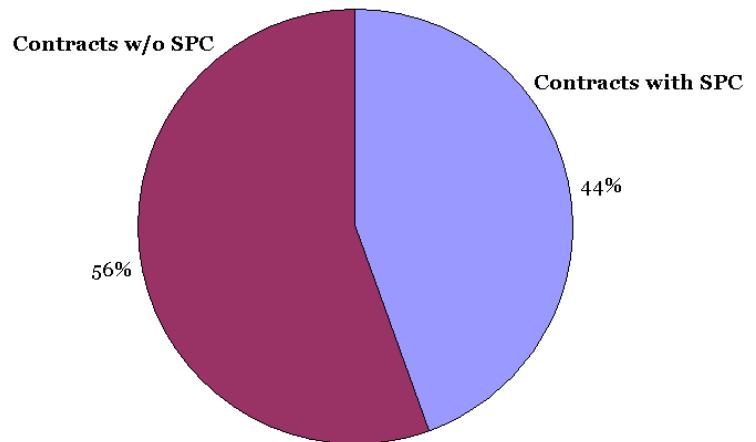




- Quality Product Costs but, not as costly as.....



PERCENTAGE OF CONTRACTS WITH SPC



- **Modernization – Built in modularity**
- **Safer IM stockpile**
- **Heavy training cycles the inventory**
- **New = production risk**
- **HERO**

IMSP Submission Cycle	None	Tier I IM Reactions										HC	
		Baseline			HC		Projected						
FY05-06	SMAW DM	III	I	Y	NA	NA	(F)	1.1E	II	I	I	F	(F)
	SMAW HE AA	(0)	(0)	(0)	(F)	(F)	1.1E	(IV)	(IV)	(0)	(F)	(F)	
	SMAW NE	Y	III	Y	(VII)	NA	NA	1.1E	Y	(IV)	Y	(P)	(P)
	MCS-M58/69	Y	Y	Y	(F)	NA	NA	1.1D	(V)	(V)	(V)	(P)	(P)
	MCS-RM	Y	III	IV	(V)	(B)	NA	1.3C	(VIV)	(VIV)	(VIV)	(P)	1.3C
	CLAWS-WDU-41/B	IV	IV	Y	(V)	NA	NA					UNK	1.3C
FY07-08	CLAWS-WPU-16/B	Y	III	Y	IV	P	NA						
	EFSS (Baseline assessed on French TNT)	(0)	(0)	(0)	(F)	(F)	1.1E						
	EFSS 120mm HE	(0)	(0)	(0)	(F)	(F)	1.1C	(V)	(V)	(V)	(P)	(F)	
	EFSS 120mm Smoke	(V)	(V)	(V)	(P)	(P)	1.1H	(V)	(V)	(V)	(P)	(F)	
	EFSS 120mm Illum	(V)	(V)	(V)	(P)	(P)	1.2G	(V)	(V)	(V)	(P)	(F)	
	EFSS 120mm Practice	(V)	(V)	(V)	(P)	(P)	1.1E	(V)	(V)	(V)	(P)	(F)	
FY09-10	40mm MK 291 MOD 0	Y	I	Y	(V)	P	NA	1.4C	Y	IV	Y	(P)	NA
	40mm MK 291 MOD 1	Y	IV	Y	(V)	P	NA	1.4C	Y	(V)	(V)	P	NA
	SMAW DM	III	I	Y	NA	NA	(F)	1.1E	III	I	I	F	(F)
	SMAW HE AA	(0)	(0)	(0)	(F)	(F)	1.1E	(IV)	(IV)	(0)	(F)	(F)	
	SMAW NE	Y	III	Y	(VII)	NA	NA	1.1E	Y	(IV)	Y	(P)	(P)
	MCS	Y	Y	I	I	F	NA	1.1D	(M)	(M)	(M)	(P)	(P)
FY11-12	French TNT (info only)	(0)	(0)	(0)	(F)	(F)	1.1E	(0)	(0)	(0)	(F)	(F)	1.1E
	EFSS 120mm HE	IV	Y	Y	III	P	F	1.21E	IV	Y	Y	(P)	(P)
	EFSS 120mm Smoke (Projectile Only)	(0)	III	IV	III	(P)	(P)	1.22H	(IV)	(IV)	(IV)	(P)	(P)
	EFSS 120mm Illum	IV	Y	IV	III	P	(P)	1.3G	IV	Y	IV	(P)	TBD
	EFSS 120mm Practice	IV	Y	IV	III	P	(P)	1.21E	(V)	Y	IV	(P)	TBD
	EFSS 120mm Tail Chrg Assembly	(0)	IV	IV	III	(P)	(P)	1.21C	(V)	IV	IV	(P)	TBD
FY11-12	EFSS 120mm Smk Mixed Pallet	III	III	(0)	(0)	P	(P)	1.21H	(V)	(V)	(V)	(P)	TBD
	40mm MK281 BA12	Y	IV	Y	(V)	P	NT	1.4C	Y	Y	Y	(P)	(1.4C)
	40mm MK281 BA21	Y	IV	Y	(V)	P	NT	1.4C	Y	Y	Y	(P)	(1.4C)
	French TNT (info only)	(0)	(0)	(0)	(F)	(F)	1.1E	(0)	(0)	(0)	(F)	(F)	1.1E
	EFSS 120mm HE	IV	Y	Y	III	P	(P)	1.21E	(V)	Y	Y	(P)	1.21E
	EFSS 120mm Smoke (Projectile Only)	(0)	III	IV	III	(P)	(P)	1.22H	(IV)	Y	IV	(P)	1.22H
FY11-12	EFSS 120mm Illum	IV	Y	IV	III	P	(P)	1.3G	IV	Y	IV	(P)	1.3G
	EFSS 120mm Practice	IV	Y	IV	III	P	(P)	1.21E	(V)	Y	IV	(P)	1.21E
	EFSS 120mm Tail Charge Assembly	(0)	IV	IV	III	(P)	(P)	1.21C	(V)	IV	IV	(P)	1.21C
	EFSS 120mm Smoke Mixed Pallet	III	III	(0)	(0)	P	(P)	1.21H	(V)	(V)	(V)	(P)	1.21H
	M59/M68*	Y	Y	I	I	F	(F)	1.1D	Y	Y	(M)	F	(F)
	M1134A4	Y	Y	Y	Y	(P)	UKN (1.4S)	Y	(M)	(M)	(V)	(P)	UKN (1.4S)
FY11-12	MK22 MOD 4 ²	(V/III)	III	Y	III	(P)	UKN 1.3C	(VIV)	(VIV)	(VIV)	(VIV)	(P)	UKN (1.3C)
	40mm HEDP - HV	(III)	Y	(0)	(0)	(F)	(F)	1.1E	(II)	(II)	(II)	(P)	(P)
	40mm HEDP - LV	(III)	Y	(0)	(0)	(F)	(F)	1.1E	(II)	(II)	(II)	(P)	(P)
	SCSG	(M)	(V)	(M)	(V)	(P)	(P)	(1.4G)	(M)	(M)	(M)	(P)	(P)
	SMAW II AUR	(M)	(V)	(M)	(V)	(F)	(F)	1.1E	(M)	(M)	(M)	(P)	(P)
	Warhead/Fuze											(P)	(P)
FY11-12	Launch/Propulsion											(V/V)	
												(V/V)	



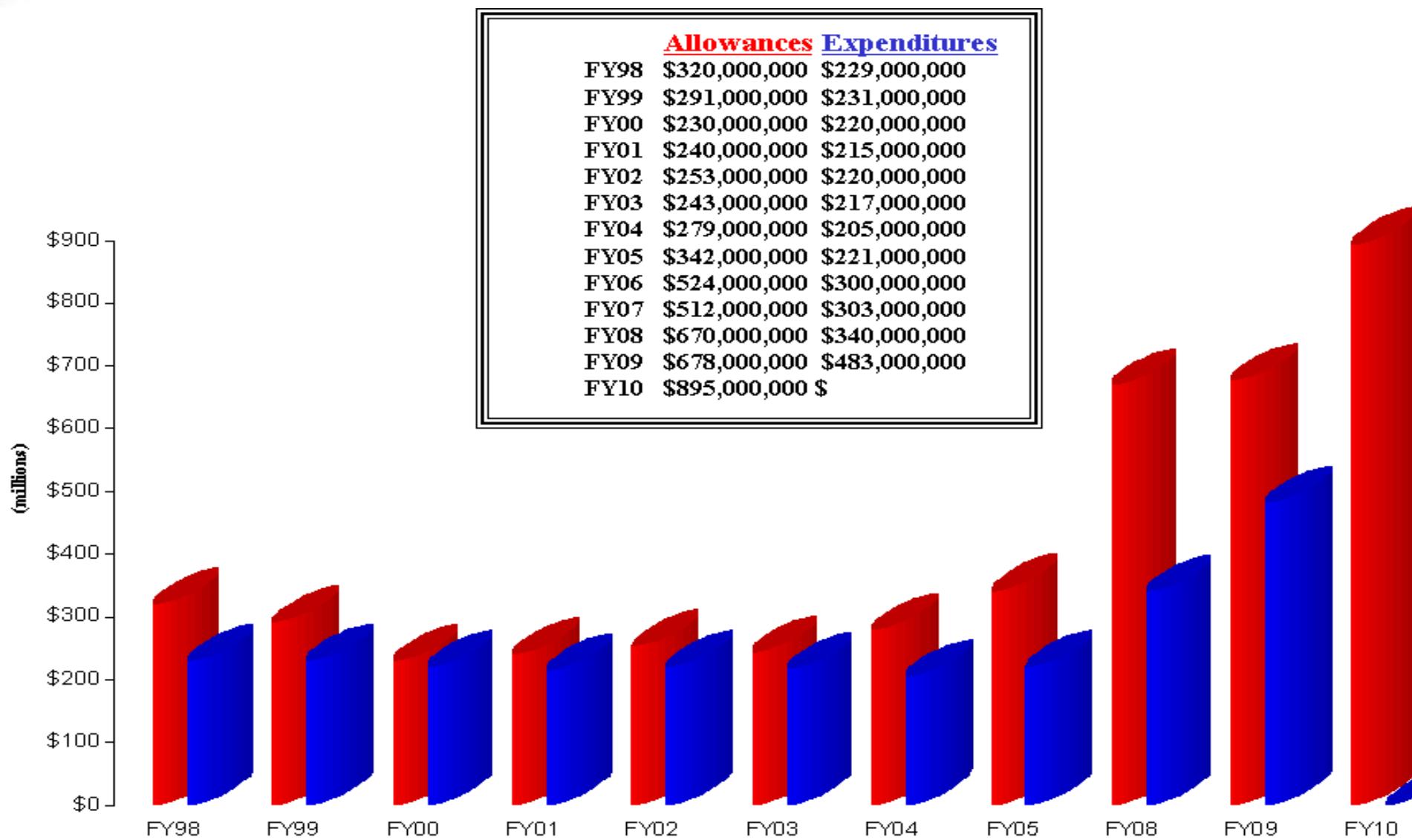


- **Unstable Funding Profiles**
- **Requirements Fluctuation**
- **Alignment of Procurements & Requirements**
- **Joint Ordnance Commanders awareness**
- **Continued Reliance on Industry**
- **Single Manager for Conventional Ammunition**
- **The Key to Success**
 - Collaboration
 - Open and Frank Communication
 - Reasonable Expectations

Thank You



Annual Comparison Training Allowances vs. Training Expenditures



**Strategic Plan Links**

- **USMC VISION & STRATEGY 2025**
- **2009 USMC S&T STRATEGIC PLAN**
- **MARINE CORPS SYSTEMS COMMAND STRATEGIC PLAN 2010-2014**
- **PM AMMUNITION 2010-2014 CONVENTIONAL AMMUNITION STRATEGIC PLAN**

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LtCol John Oliver, Deputy PM Ammo, 703-432-8778, John.g.oliver1@USMC.mil



Unclassified

SUSTAINING AMERICA'S ARMY: THE STRENGTH OF THE NATION



Munitions Executive Summit

9 Feb 10

Ms. Susan Carlson
Munitions Division
Deputy Chief of Staff, G-4
Headquarters, Department of the Army



MISSION

- Provide Army Staff responsibility and oversight for policy, plans, and resources for:
 - Conventional ammunition
 - Missiles
 - Toxic chemical storage
 - Ammunition surveillance
 - Demilitarization
 - Explosives safety and environmental compliance
- Specifics:
- Distribution of the Army's munitions stockpile.
- Perform ammunition and missile stockpile management functions.
- Develop policy for and monitor ammo surveillance and environmental compliance. Oversight on emerging missile, ammo and ammo information Mgt systems.



Ammunition Readiness

□ What the program does:

- Provides National level management, procurement and sustainment of conventional ammunition for all Services (SMCA)
- Provides for transportation, maintenance, ammo logistics RDT&E, Army ammo safety and management of Army ammunition and management of ammunition in the Pacific theater
- Demilitarization of obsolete/excess conventional ammunition for all Services and the development of new demil technologies
- Safe, secure, and environmentally compliant storage of the Nation's stockpile of toxic chemical munitions pending disposal



New Demilitarization Law Effective FY2007 Resource Recovery and Recycling (R3)

BEFORE

1. Installations execute demilitarization.
2. Salvageable material sold.
3. Proceeds sent to US Treasury.

AFTER

1. Installations execute demilitarization.
2. Salvageable material sold.
3. PM-Demil reinvest proceeds into R3 Programs.

THE LAW

The Law allows the Army to sell recyclable munitions materials resulting from demil and to reinvest the proceeds into demil Resource Recovery and Recycling (R3).

THE BENEFIT

Estimate \$2-3M annually to support Demil R3 Program execution, RDTE and APE.



Challenges

❑ Funding

- OMA
 - Taking Risk in Surveillance, Stockpile Mgmt
 - Limits flexibility to redistribute
 - Increases depot release time
- PAA - Demil
 - Growing demil stockpile creates storage inefficiencies
 - Postpones Demil to out years, more expensive
 - Reduces ability to efficiently and effectively store munitions and increases time needed to outload

❑ Distribution Management

- Planning/Coordination with TRANSCOM as the Distribution Process Owner
- Asset distribution/Visibility



One Thing Remains Constant



**The Soldier -
the Centerpiece of the Army**
Living the Warrior Ethos -
on duty protecting the Nation
and the society they serve.



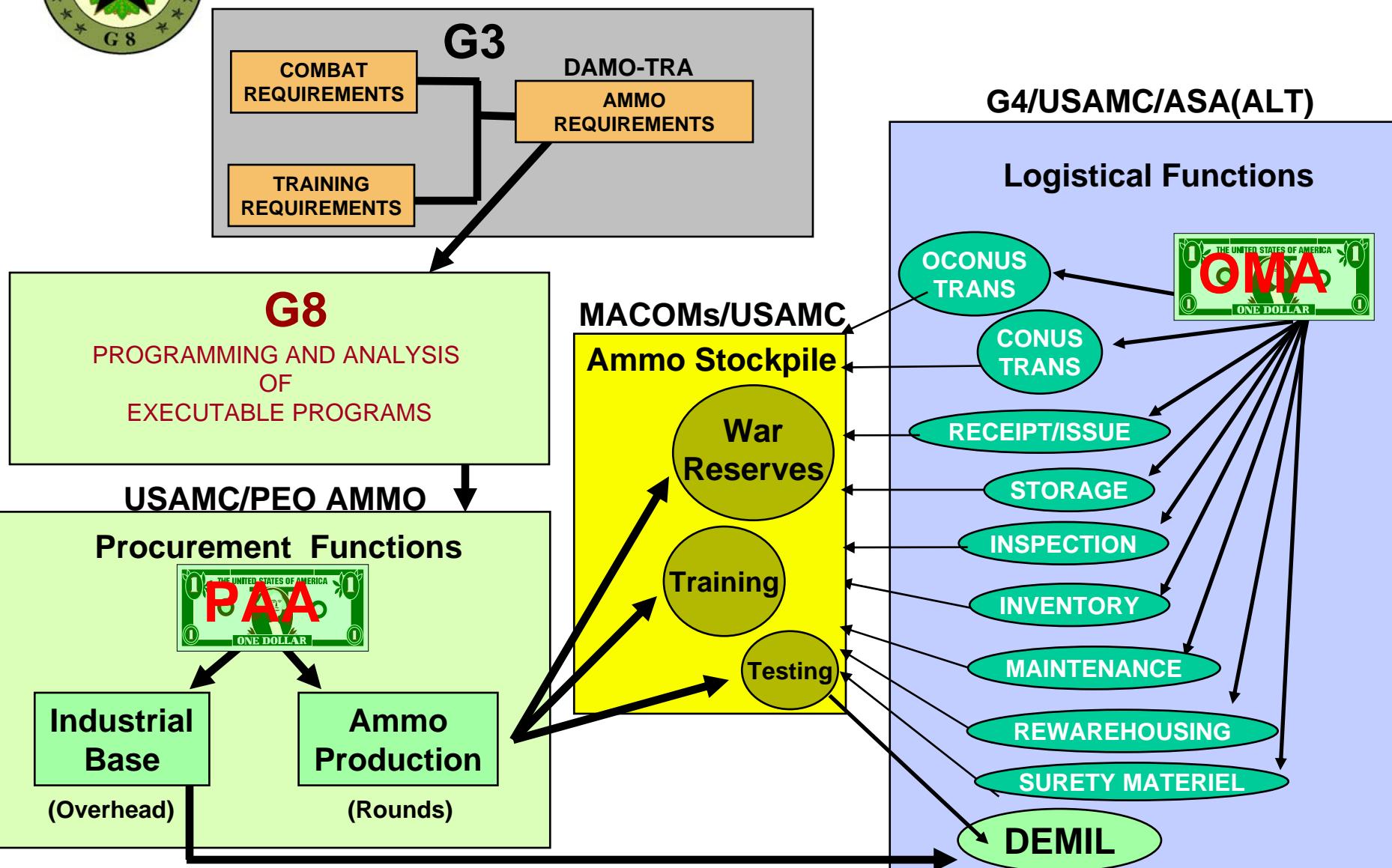
AMMO FUNDING

*Mr. Don Chrans
Army G8 / FDX Munitions Division*

February 2010

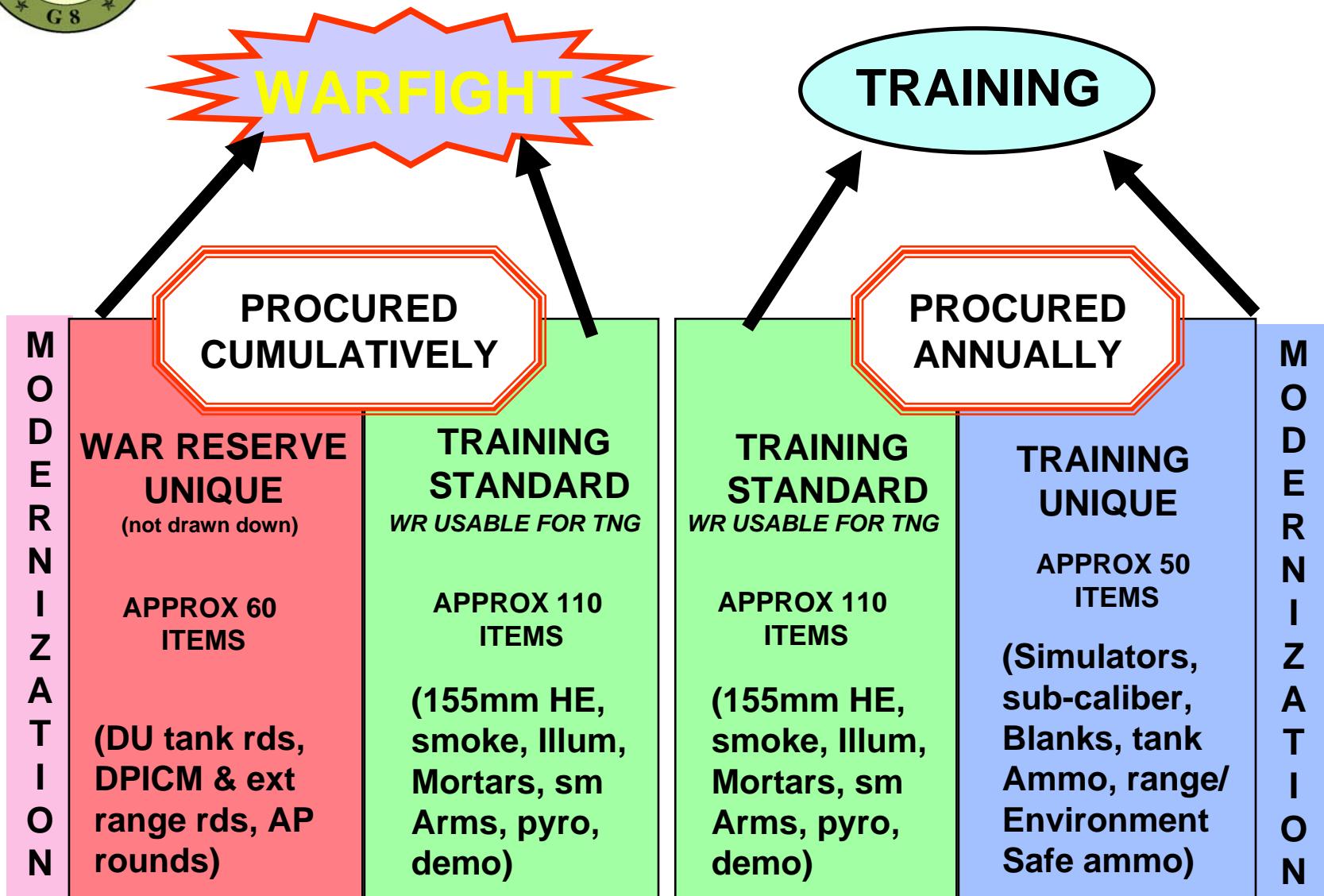


How Ammo Works



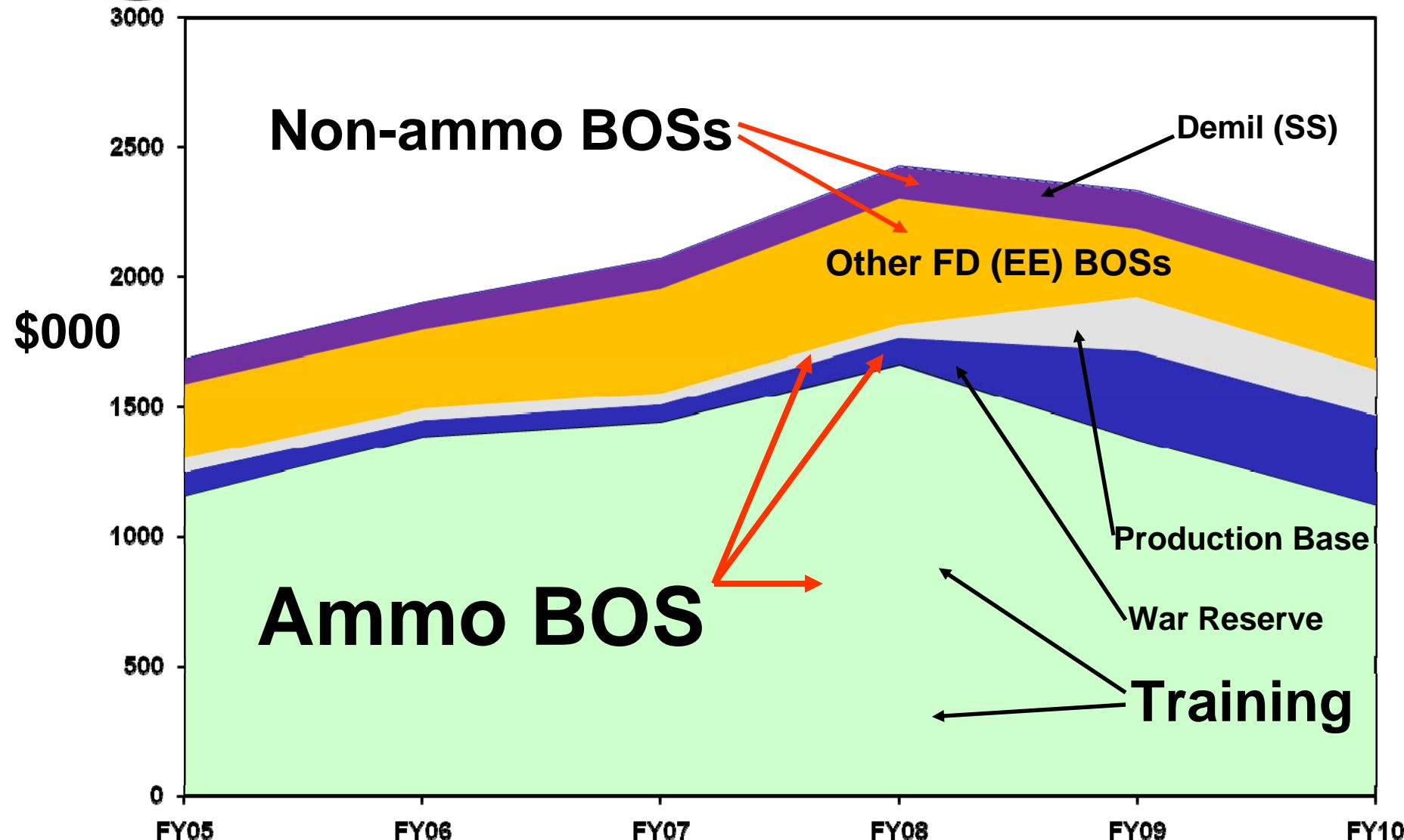


Ammunition Categories





Total Ammunition (PAA) Picture





What is PAA?

(Procurement of Ammunition, Army)

Two Activities:

- Activity 1 - Ammunition

- Training/Test Ammo
- War Reserve Fill
- Hydra Rockets Training Ammo
- War Reserves/Modernization

Supplemental
\$371M

FY10

\$1,732M

\$1,125M - Ammo BOS
\$343M - Ammo BOS.
\$100M - Aviation BOS
\$164M - Other FD BOSSs.

- Activity 2 - Prod Base Support

- Industrial Facilities
- ARMS
- Demil

\$319M

\$170M - Ammo BOS.
\$3M - Ammo BOS.

\$146M - SS PEG / G-4

- TOTAL

\$2051M



What is Ammo BOS?

Three Major Decision Packages (MDEPs)

		<u>FY 10\$\$</u>
1. RE01	TRAINING AMMO	\$1125M
2. RE06	WAR AND OPS AMMO	\$ 343M
3. RE04	PRODUCTION BASE	<u>\$ 173M</u>
	TOTAL	\$1641M

- Does not include non-Ammo BOS items (Hydra Rockets, Excaliber, M829A3, etc. in RE01 Or RE06, and does not include Demil in RE04)



AMMO FUNDING

FY10 Base Budget

	Root	Request	Appropriated	Delta	Reason for Delta
BASE	AIRCRAFT LAUNCHED AMMO	96,572	94,572	-2,000	30mm Unjustified Program Growth
	AMMO PRODUCTION BASE	173,428	180,228	6,800	Projects at SCAAP and LCAAP
	AMMUNITION SUPPORT	43,608	49,928	6,320	Blue Grass equip and Supercritical Water Oxidation demil
	APL-A	56,387	56,387		
	ARTILLERY AMMO	183,942	180,142	-3,800	-5,000 105mm; -6,000 MACS; +7,200 155mm Illum
	AVIATION FLARES	75,242	63,242	-12,000	General reduction
	DEMIL	145,777	145,777		
	DEMOLITIONS	18,793	18,793		
	EXCALIBUR	62,292	62,292		
	GRENADES	49,910	49,910		
	HYDRA ROCKET	99,904	99,904		
	MEDIUM CALIBER AMMO	189,729	193,729	4,000	40mm all types
	MGS-STRYKER AMMO	7,741	7,741		
	MINES	815	815		
	MORTAR AMMO	157,287	164,687	7,400	60mm WP; 60mm Illum; 120mm Illum
	PGK	19,870	19,870		
	NON-LETHAL AMMO	7,378	7,378		
	PROTECTIVE SYSTEMS (IMS)	19,507	19,507		
	SHOULDER FIRED ROCKETS	45,302	42,802	-2,500	General reduction
	SIGNAL MUNITIONS	7,852	7,852		
	SMALL CALIBER AMMO	452,816	452,816		
	SPECIAL AMMUNITION	12,179	12,179		
	TANK MAIN GUN AMMO	113,483	113,583		
	SIMULATORS	12,081	12,081		
Grand Total		2,051,895	2,056,115	4,220	

DAPR-FDX



AMMO FUNDING

FY09 Base Budget Request

	Root	Request	Appropriated	Delta	Reason for Delta
BASE	AIRCRAFT LAUNCHED AMMO	79,066	75,766	-3,300	30mm Unjustified Cost Growth
	AMMO PRODUCTION BASE	201,106	207,526	6,420	Projects at HSAAP, SCAAP, RFAAP, and Blue Grass
	AMMUNITION SUPPORT	41,449	41,449		
	APL-A	52,000	52,000		
	ARTILLERY AMMO	177,598	179,198	1,600	155mm all types
	AVIATION FLARES	68,376	68,376		
	DEMIL	143,901	143,901		
	DEMOLITIONS	28,886	32,086	3,200	Rapid Wall Breaching Kit (RWBK)
	EXCALIBUR	34,220	34,220		
	GRENADES	71,608	77,208	5,600	Thermite Grenades, Smoke Grenades
	HYDRA ROCKET	142,521	142,521		
	MEDIUM CALIBER AMMO	308,064	306,364	-1,700	25mm Unjustified Cost Growth
	MGS-STRYKER AMMO	7,662	7,662		
	MINES	7,452	7,452		
	MORTAR AMMO	193,177	201,577	8,400	Various Rounds, \$1.2M 105mm HEP
	PGK	15,633	15,633		
	NON-LETHAL AMMO	3,324	3,324		
	PROTECTIVE SYSTEMS	17,869	64,369	46,500	NLCS Bridge Supplemental
	SHOULDER FIRED ROCKETS	29,638	29,638		
	SIGNAL MUNITIONS	34,688	34,688		
	SMALL CALIBER AMMO	444,782	436,169	-8,613	.50 cal all types, Unjustified Cost Growth
	SPECIAL AMMUNITION	6,843	6,843		
	TANK MAIN GUN AMMO	125,151	125,151		
	TANK-ABRAMS AMMO	34,031	34,031		
Grand Total		2,269,045	2,327,152	58,107	

DAPR-FDX



Ongoing Budget Actions

- FY11 Base Budget and Overseas Contingency Operations (OCO) Requests at Congress (last week – hopefully)
- Currently building FY12-17 POM and 12 OCO
- Incorporating changes based on SECDEF decisions on programs
- Quadrennial Defense Review underway
- Impacts of Cluster Munitions policy
- Army evaluating ARFORGEN impact to training



Ammo Procurement Summary

Ammo Funding is a Balancing Act

- Training
 - Provide enough ammo for units to train
 - Buy enough ammo to replenish what is expended
- War and Operations
 - **SUSTAIN SOLDIERS IN CURRENT OPERATIONS**
 - Replenish stocks expended in operations
 - Build/Replenish War Reserve stocks
 - Modernize stocks in the process
- Industrial Base
 - Replace/Upgrade/Repair organic capabilities
 - Transition to efficiency upgrades
 - Ramp down production to avoid sharp changes

PEO Missiles and Space

Munitions Executive Summit 2010

MISSILES AND SPACE



*Program Executive Office
Missiles and Space
BG(P) Genaro Dellarocco
Program Executive Officer
February 2010*





THE ARMY MISSILE BUSINESS

FMS

- 35 Countries
- Total FMS Case Value: \$23.6B
- FY09 FMS Funding ~\$12B
- FY10 Projected FMS Funding ~\$13B



Co-Op Programs

- MEADS
 - Germany
 - Italy
- MLRS
 - Germany
 - Italy
 - UK
 - France

Services

- Army
- Air Force
- Navy
- Marine Corps

Joint / International Representation

- 2 USMC and 1 USN Officers
- 29 International Officers / Civilians
 - Representing 14 Countries



Army Users

- Army Capabilities Integration Center (ARCIC)
- Fires Center
- Aviation Center
- Maneuver Center



END-TO-END MISSILE LETHALITY

BMC4I



Launchers

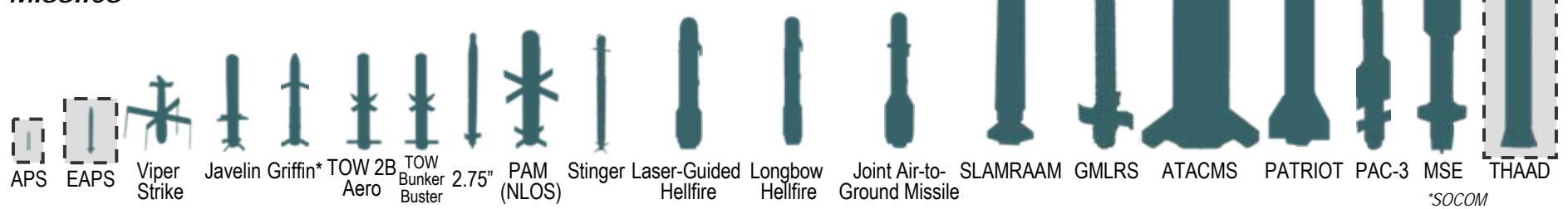


Radars



Not part of PEO MS portfolio
but has mission equity

Missiles





FOCUS AREAS

- Industrial Funded Internal Research and Development
- Scalable Lethality
- FMS
- Quality
- Obsolescence
- Material Shortages
- Affordability / Continuous Improvement
- Weight Reduction
- Data Rights
- Condition Based Maintenance (CBM)
- Health Monitoring Systems
- Extended Range



Industrial Committee of Ammunition Producers (ICAP)

2010 Progress Report

Michael S. Wilson
Industry Chairman

Munitions Executive Summit
9 February 2010



ICAP – Overview

Mission: *To serve as a forum for interested NDIA members and other concerned parties to review and discuss issues, policies, and procedures in the ammunition arena and to examine industry and government initiatives relating to the ammunition life cycle.*

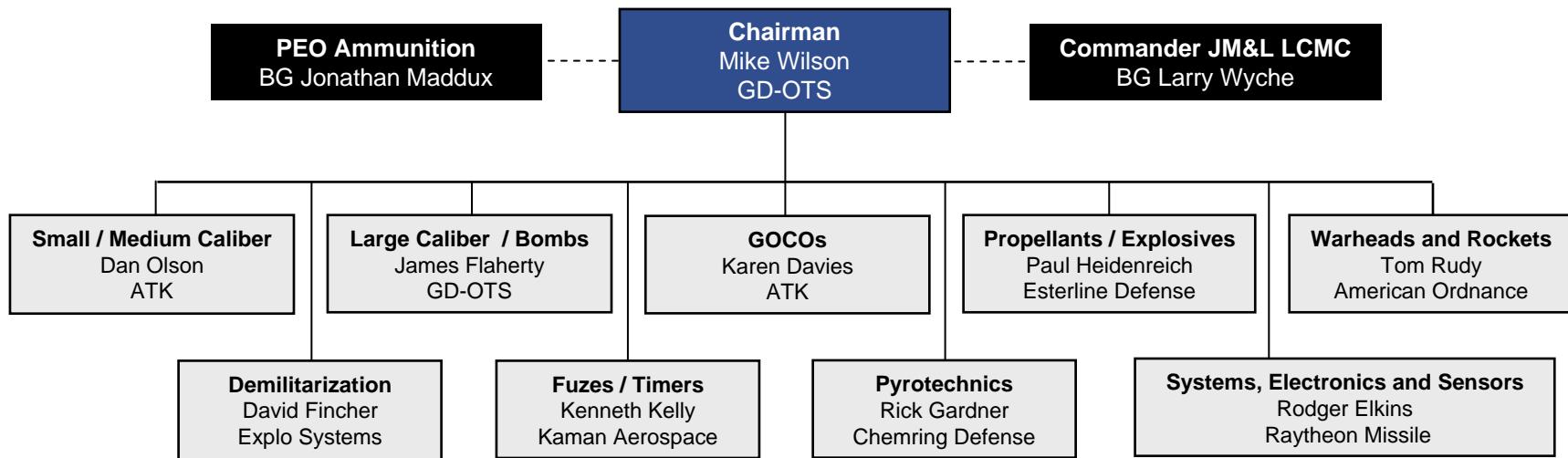
Objective: *To provide a forum for the open exchange of Government and Industry views related to the DoD ammunition area. Specific objectives include:*

- *Review and discuss Government ammunition acquisition policies, procedures, and actions.*
- *Report on the various sectors of the ammunition industry.*
- *Identify impediments to sustaining a responsive ammunition industrial base.*
- *Provide a platform for cooperation and collaboration in resolving issues related to the ammunition life cycle from development through disposal.*



ICAP – 2010 Organization

Membership: The ICAP will be formed from the NDIA corporate executives from Industry defense producers of ammunition and ammunition components.



**Government and Industry
Partnering for Success**

ICAP – Focus Areas

- *Readiness and sustainment of the Munitions Industrial Base*
- *Industrial Base modernization initiatives*
- *Acquisition improvement initiatives*
- *Standardization of EPA clauses*
- *Six Sigma and Lean Manufacturing disciplines*
- *Soft Landing Sub-committee – Bob Harris, Barry Bates, Bill Holmes, Jyuji Hewitt, Rich Palaschak, Jim Sutton*
 - *Early awareness of the issue*
 - *Facilitate short and long-term mitigation strategies*
 - *Foster communication across the munitions*



Shaping Industrial / Acquisition Strategy

Project Manager Maneuver Ammunition Systems

Munitions Executive Summit



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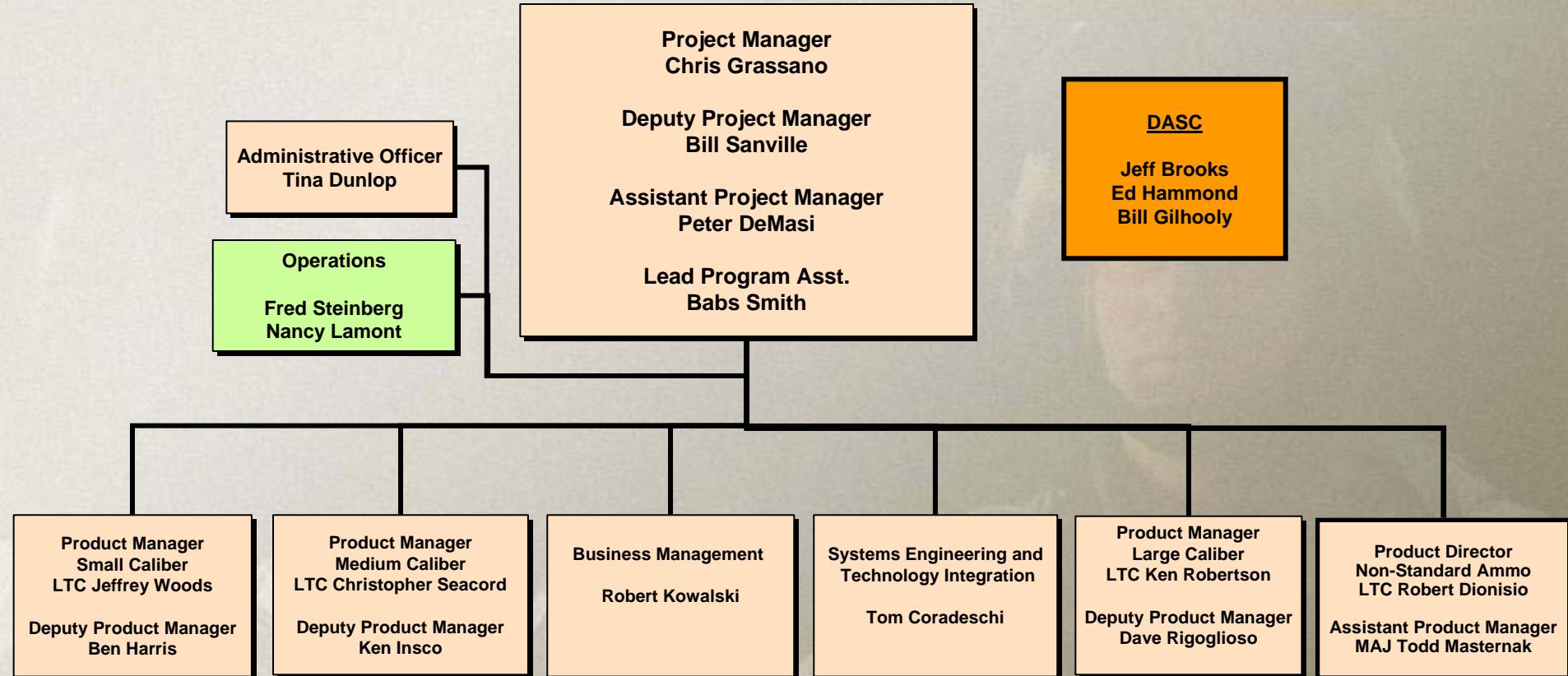


Chris Grassano
Project Manager
Maneuver Ammunition Systems





Project Manager Maneuver Ammunition Systems





Project Manager Maneuver Ammunition Systems (MAS)-Direct Fire



Equipping US and Allied Warfighters with World Class
Direct Fire Combat and Training Ammunition Through
Strategic Life Cycle Management



Support to Warfighter

FY09 Deliveries of DoD Munitions

Shotgun Shells	7.5M
Pistol Ammo	71.7M
5.56mm Ammo	1,012M
7.62mm Ammo	317M
.50 Cal Ammo	93M
20mm Cannon	5M
25mm Cannon	1.9M
30mm Cannon	6.7M
40mm Grenades	16.5M
105mm Tank	3K
120mm Tank	91K
Total	1,530M

FY09 Deliveries of NSA Munitions

Rifle Ammo	103M
Mortars	8K
RPGs	308K
Grenades	360K
Aircraft Munitions	15K
Total	103M

FY10 Look Ahead

- 5.56mm Green Ammo to Field in May 2010
- M829E4 Development Started

Working to Incorporate Evolutionary Improvements that improve Reliability, Lower Cost, Improve Safety and Grow Performance



Acquisition Challenge (Small Caliber/40mm RDT&E)



- **Issue:** Bulk of Small Arms (5.56mm thru 40mm) Ammo designs are 30-80 years old and lack of performance requirements prevent resourcing improvements
 - JCIDS process will require ~29 months to provide validated requirements
- **Plan:** Technology is available to provide improvements in performance, survivability, lighter weight, and ease of use now
 - Budget RDT&E funding in POM and generate requirements docs
- **Status:** Held Weapon Systems Review Special Session with DA
 - Agreement to look at what could be done to support technology insertion
 - G3 & TRADOC will prioritize and MCOE will provide a memo of endorsement
 - MCOE will start drafting requirements based on CBA gaps



Acquisition Challenge (NSA)

- **Issue:** Lack of centralized acquisition and standards for NSA had led to poor quality ammunition and long acquisition times
- **Plan:** PEO-Ammo established an office to serve as Product Director for Non-Standard Ammunition (PD NSA)
 - PD NSA established an Acquisition Strategy and Implemented Acquisition Processes to ensure Technical Management and Quality Assurance
 - This improved timeliness and enforced specification standards
- **Status:** Established long term contracts using Multiple Prime Contractors to support the war effort
 - Currently in process of establishing long term solution to NSA needs within the Army outside of Theater to support testing and training for the services





How Can Industry Help?

- **Provide ideas & technology to modernize ammunition and improve our warfighting capabilities**
- **Maintain engineering and scientific talent with limited and decreasing RDT&E dollars**
- **Maintain warm and cold surge capabilities with production quantities decreasing**
- **Prepare transition to lower production rates while maintaining reasonable costs, high quality and avoiding complacency**

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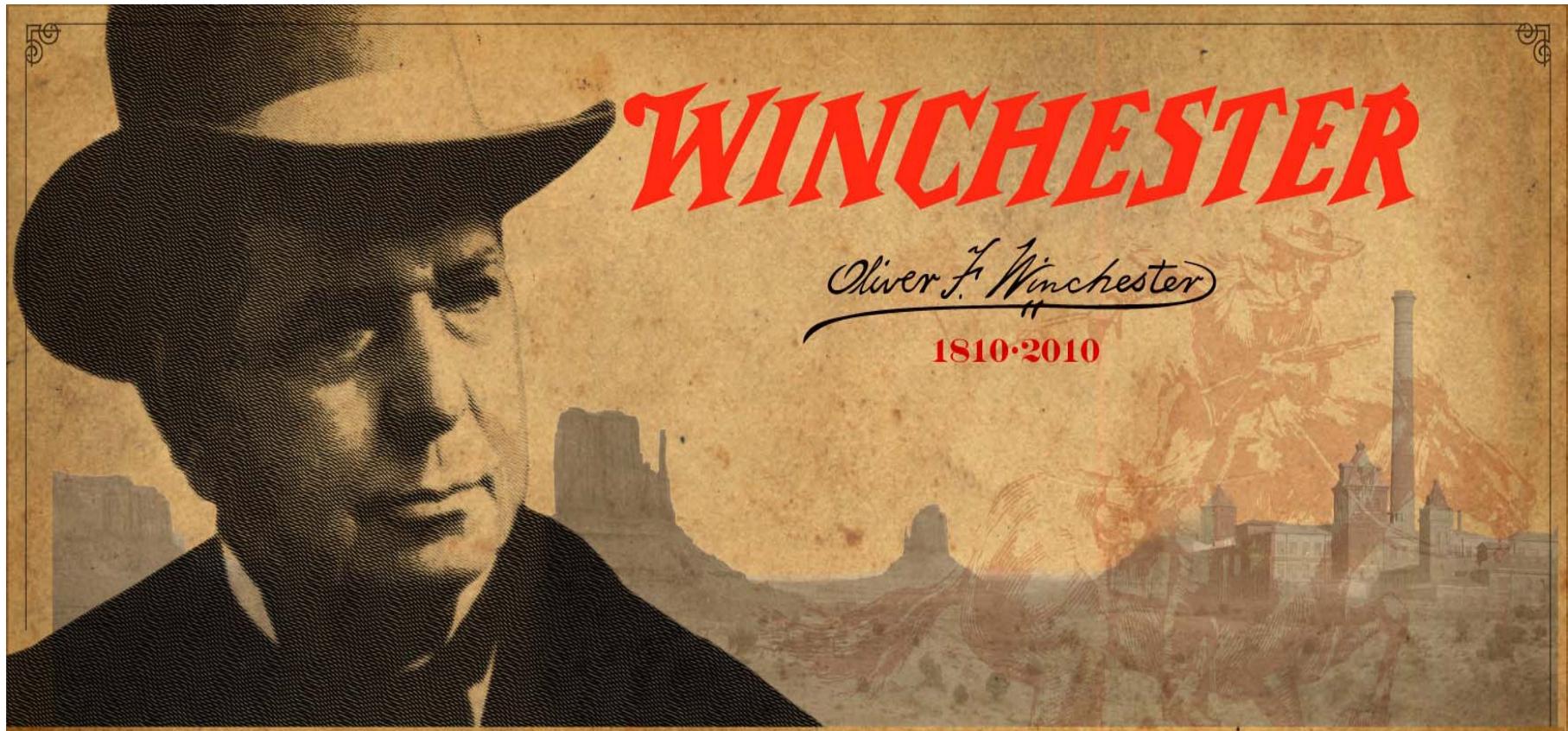
WINCHESTER[®]
AMMUNITION

**Aligning Commercial Industrial Capabilities with
Munitions Requirements & Resources**

Dick Hammett, President, Winchester Ammunition

Munitions Executive Summit

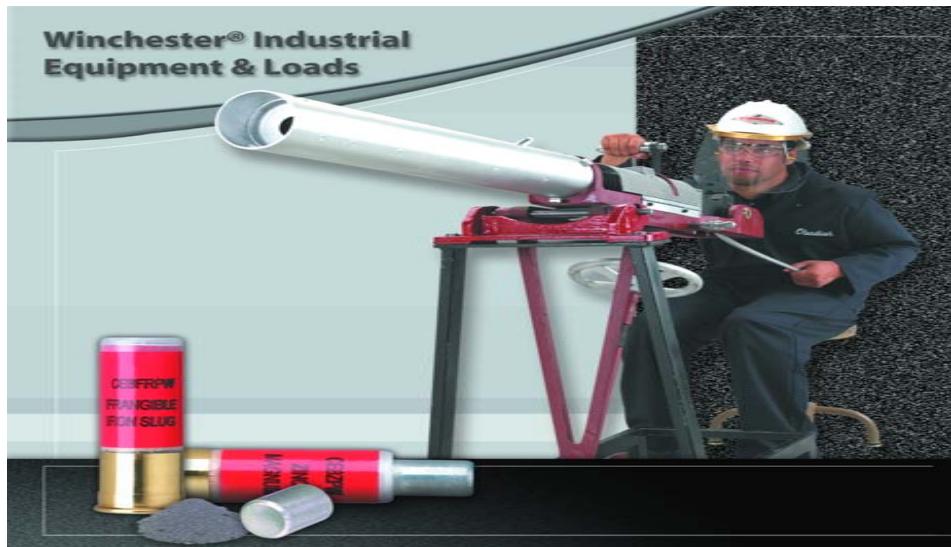
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COMMEMORATING 200 YEARS OF A LEGEND

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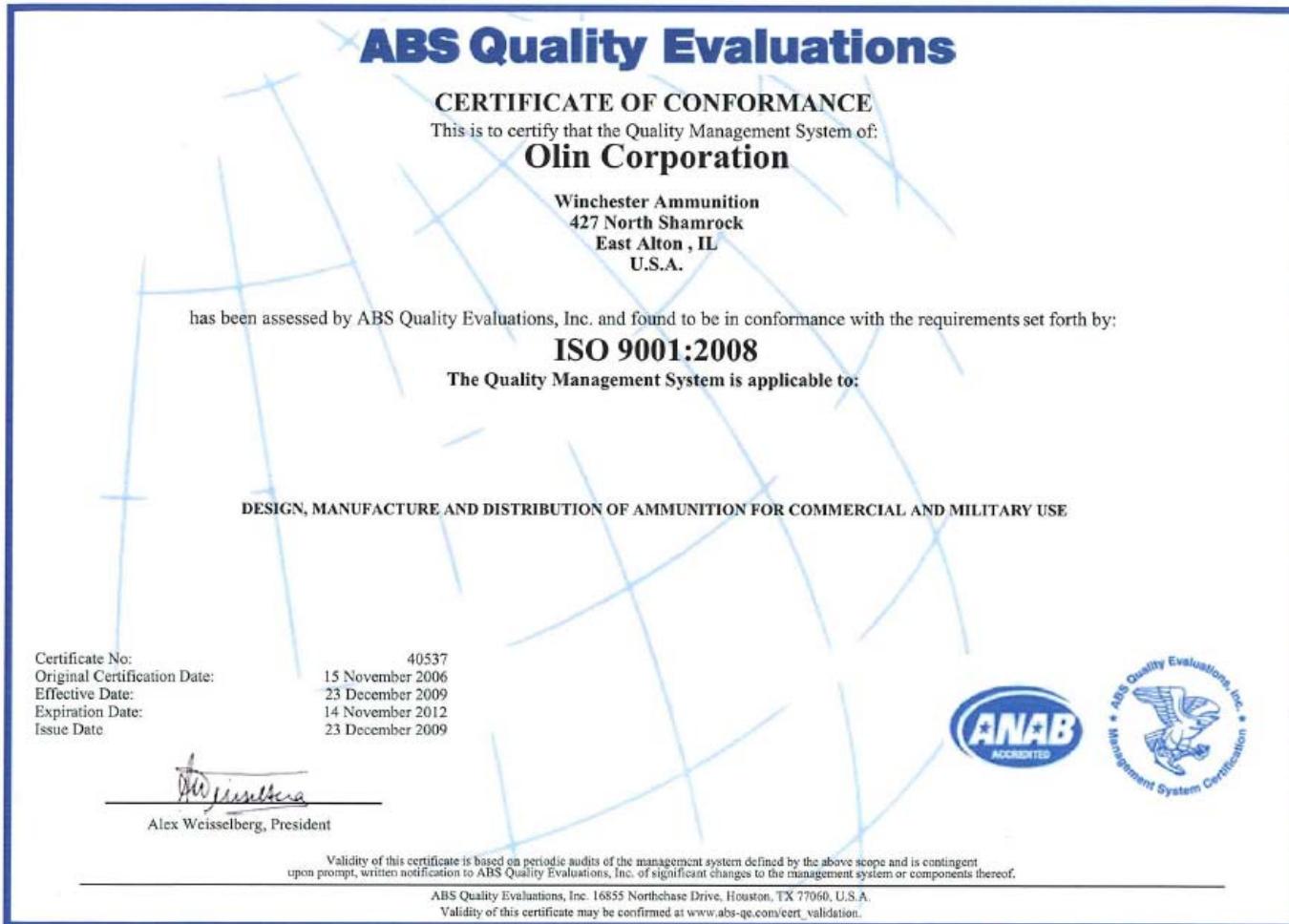




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“WINCHESTER Ammunition commits to meet customer expectations 100% of the time utilizing the continual improvement process.”



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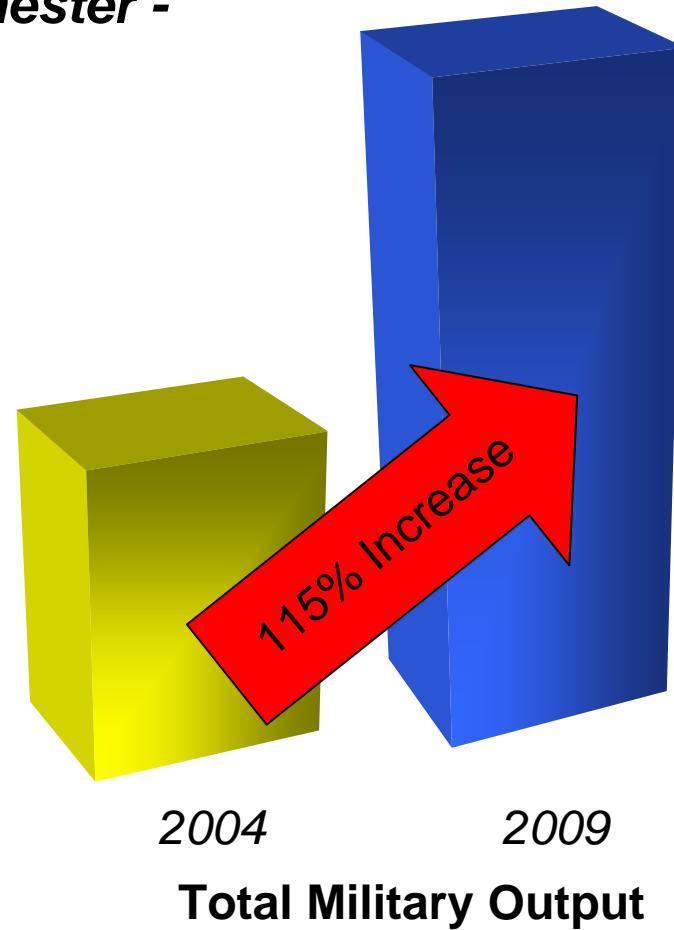
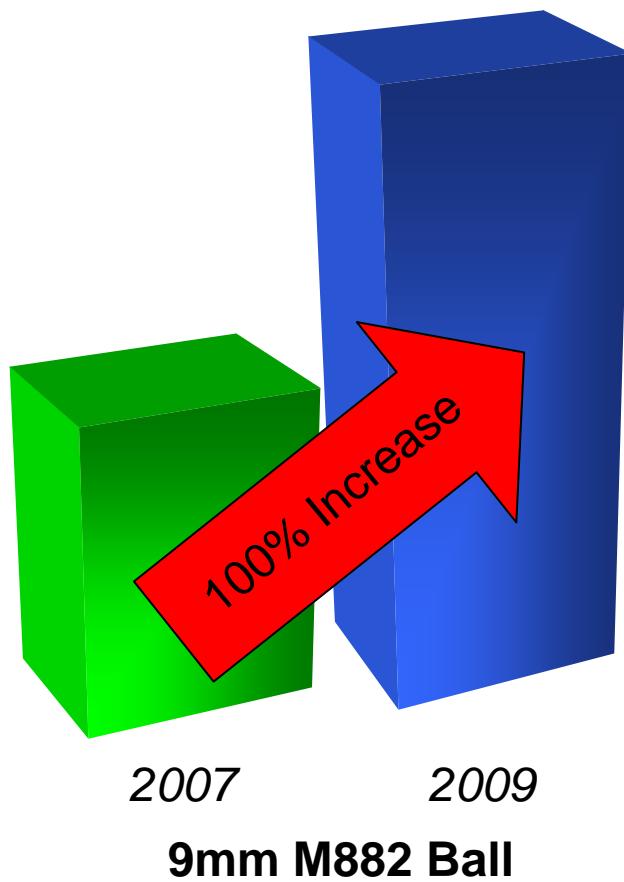


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Military Production Surge at Winchester -



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Keys to Maintaining Capability –

- Long Term Commitments/Reliable Forecasts
- Limit Offshore Procurements
- Effective Use of EPA Clauses
- Avoid the FAR “Fair Opportunity” Clause
- Recognize differences in GOCO & COCO Financial Systems



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Readiness



Sourcing Options

Surge Capability

Skilled Workforce

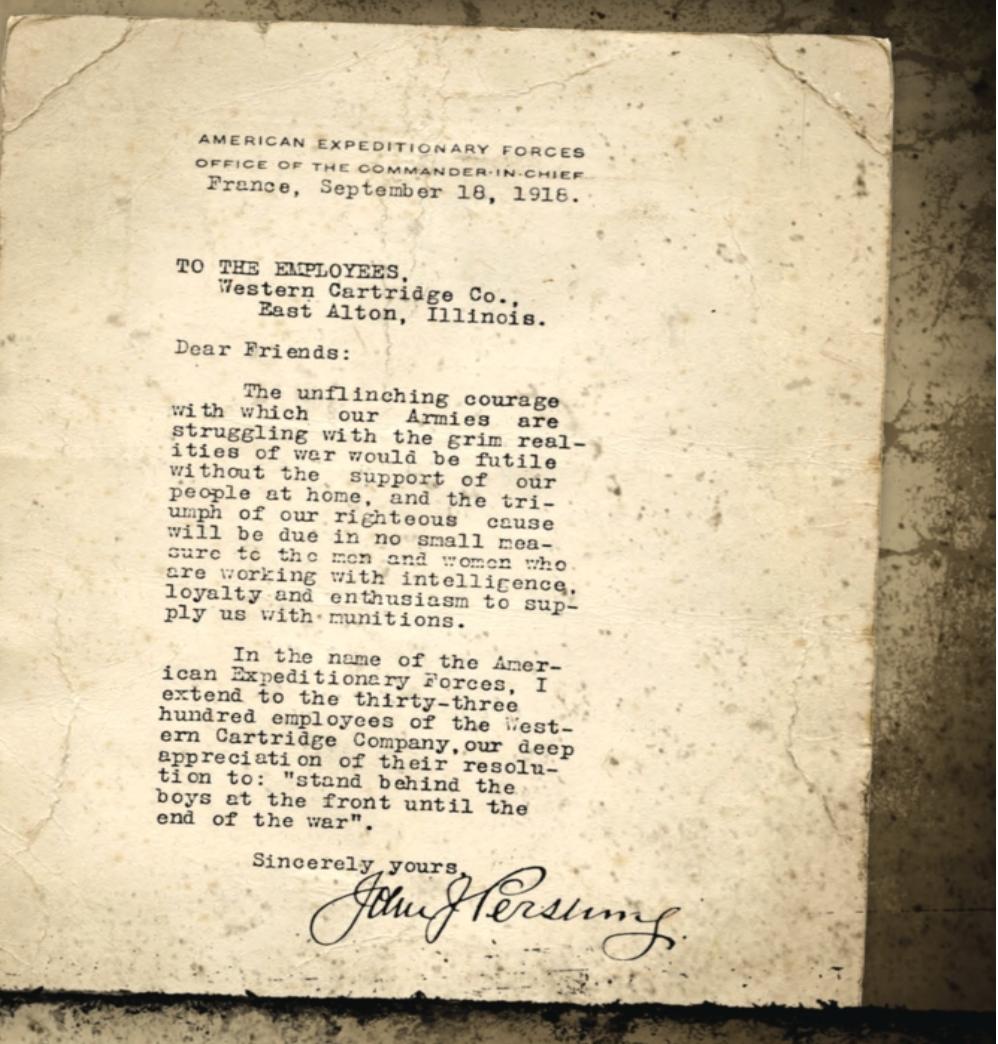
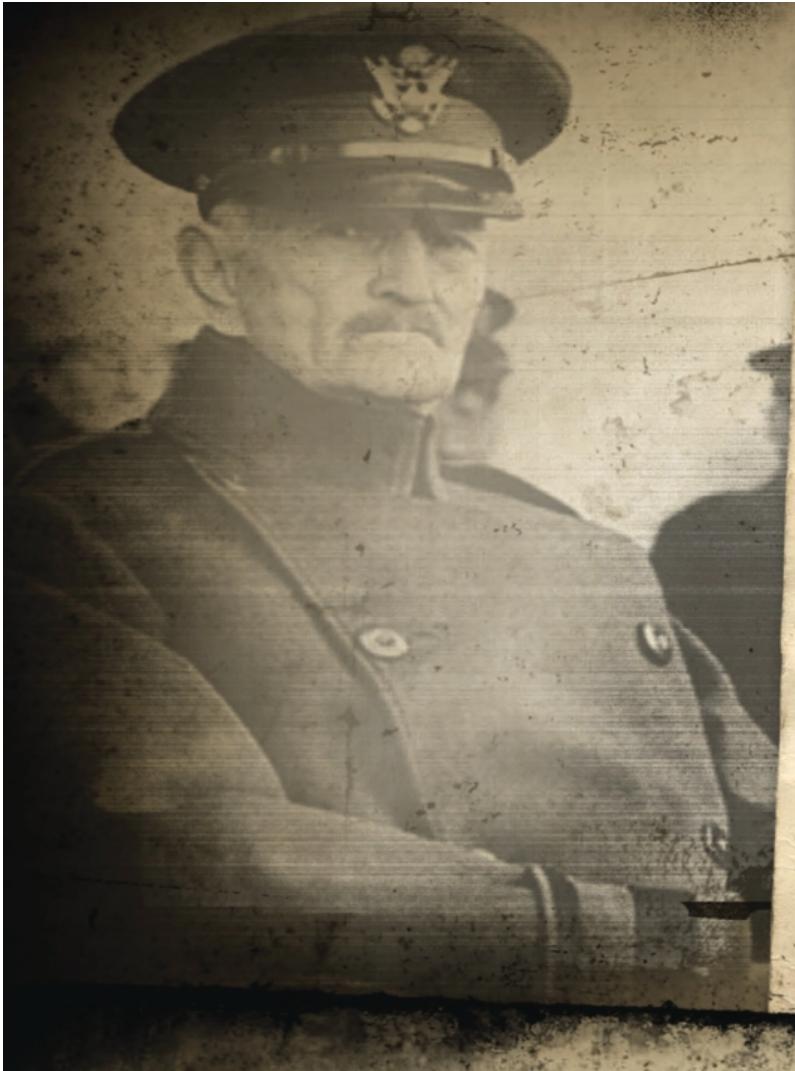
Risk Mitigation

Organizational Agility

Flexible Solutions

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2010 Munitions Executive Summit

O/EDCA and Navy



Relocation to Picatinny Arsenal

CAPT Jeff Horton, SC, USN

Office of Executive Director for Conventional Ammunition (O/EDCA)





Integration of the O/EDCA with PEO AMMO/SMCA at Picatinny Arsenal

Office of the Executive Director for Conventional Ammunition (O/EDCA)

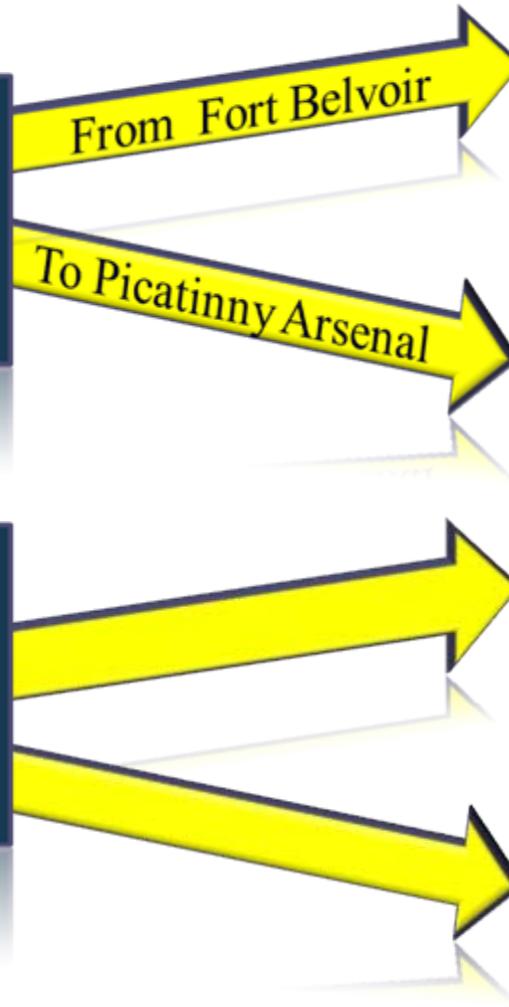
- Assessment, oversight and support of Single Manager of Conventional Ammunition (SMCA)

Conventional Ammunition (AMC) management integration
is the responsibility of the Office of the Executive Director for Conventional Ammunition (O/EDCA).

PM Joint Services

- Industrial Base Management
- Demilitarization
- Bombs and Energetics
- Technology and Prototyping
- Ammunition Logistics
- SMCA/Service Integration

– SMCA/Service Integration
– Conventional Ammunition



O/EDCA

- Assessment, oversight and support of SMCA
- Service Advocate (USAF/USN)

Project Director, Joint Products

- Bombs and Energetics
- Navy Gun Ammunition
- Support of SMCA
- Service Advocate (USAF/USN)

Project Director, Joint Services

- Industrial Base Management
- Demilitarization
- Technology and Prototyping
- Ammunition Logistics
- SMCA/Service Integration
- Service Advocate (USA)



Integrated Concept

Project Director Joint Services (USA)

➤ Coordinates program activities with the Acquisition Community, industry, Army and OSD Staffs. Responsible for the planning, programming, budgeting and execution of Army funding exceeding \$2.2B over the POM 10-15. Act as Service representative for SMCA-related issues, advocate for efficiency and effectiveness across the Research Development Acquisition & Life Cycle Management Command arena and assist in assessment of overall SMCA execution. Performs Title X (Equipping) functions and is responsible for managing the following:

➤ conventional ammunition & missile demilitarization programs for all of the DoD's Armed Services



➤ Production Base Support program; Industrial Base Strategic planning;; implementation of Public Law 105-261, Section 806.



➤ Ammunition Manufacturing Technology program



➤ Ammunition logistics R&D



INCUMBENT: USA. Must be Acquisition Level III certified. Rated and Senior Rated by SMCA Executor (PEO Ammunition).

EDCA

2/18/2010

Project Director Joint Products (USN / USAF)

➤ Coordinates program activities with the Acquisition Community, industry, Navy and Air Staffs, and OSD Staff. Accountable for the execution of Air Force and Navy resources exceeding \$1.6B over the POM. Act as USN/USAF Lead Service Representative for SMCA-related issues, advocate for efficiency and effectiveness across the Research Development Acquisition & Life Cycle Management Command arena and assist in assessment of overall SMCA execution. Responsible for the acquisition planning and management of the following Air Forces and Navy Products:

➤ General Purpose Bomb (500 lb, 1000 lb, 2000 lb) and Penetrator Bombs (2000 lb)



➤ Bomb Fuzing (e.g. FMU-143)



➤ Bomb Components including all training bombs;



➤ Navy's Gun (5"/54), 76mm, and 57mm tactical and training ammunition programs.

INCUMBENT: Rotate between USN/USAF. Recommend acquisition certified. Supporting input for rating provided by SMCA Executor (PEO Ammo) & LCMC ; Senior Rated by EDCA.

O/EDCA Deputy Executive Director for Conventional Ammunition (USAF / USN)

➤ Responsible for assessing the overall SMCA mission and oversight of the SMCA mission as it relates to joint service activities; assisting the EDCA in oversight of Joint Service activities; monitoring and assessing the execution of the SMCA mission functions; and maintaining SMCA performance metrics and publishing an annual SMCA performance report utilizing input from PEO and JMC. Act as USN/USAF Lead Service Representative for SMCA-related issues, advocate for efficiency and effectiveness across the Research Development Acquisition & Life Cycle Management Command arena and assist in assessment of overall SMCA execution. Assists with SMCA Mission.



INCUMBENT: Rotate between USAF and USN. Recommend acquisition certified.

Rated and Senior Rated by EDCA with LCMC input.



BRAC Implementation – Recommendation #186 Tech 0018B

Integrated Weapons and Armament Specialty Site for Guns & Ammunition at Picatinny Arsenal

Munitions Executive Summit 2010

Indian Head Division NSWC Detachment Picatinny Organizational Overview

Prepared by:

David L. Rogers

Indian Head Division NSWC

Picatinny Detachment Transition Manager

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973-724-7017

Released by:

John G. Hungerford

Indian Head Division NSWC Systems Integration

Department Head John.G.Hungerford@navy.mil

301-744-4646

973-724-9301



Integrated Weapons & Armaments Specialty Site for Guns & Ammunition

BRAC 2005 RECOMMENDATION 186 TECH 0018B

Move Gun and Ammo RD&A functions to Picatinny Arsenal, NJ from:

- NSWC Crane, IN (except energetics and RD&A T&E in support of Special Operations)
- NSWC Port Hueneme Detachment Louisville, KY
- NAWC China Lake, CA (except energetics)
- NSWC Crane Detachment at Fallbrook, CA

**Move Weapon and Armament Packaging, Handling, Storage and
Transportation (PHS&T) RD&A and T&E function from NSWC Indian
Head Detachment Earle, Colts Neck, NJ**

Integrated Weapons & Armaments

Specialty Site for Guns & Ammunition

BRAC 2005 RECOMMENDATION 186 TECH 0018B

BRAC Definitions for RD&A and T&E:

- **Research** means basic research (6.1), applied research (6.2) and advanced development (6.3).
- **Development and Acquisition** means system development and demonstration, system modifications, experimentation and concept demonstration, and product/in-service life-cycle support.
- **Test and Evaluation** means Developmental Test and Evaluation (DT&E) and Operational Test and Evaluation (OT&E). Test and Evaluation also includes facilities that provide measurements and analyses for science and technology (S&T) development and acquisition (D&A), developmental test and evaluation, operational test and evaluation, live fire test and evaluation, contractor test and evaluation, joint test and evaluation, in-service engineering testing, safety certifications, concept refinement, advanced technology demonstrations, shelf-life and lot verification testing, and for experimentation when predominantly used for acquisition or materiel decisions.

Current Anticipated End State

Realign 240 to Picatinny*
as of 11 September 2009

* The actual number of FTEs subject to realignment is dependent upon the customer funded workload.

Crane (190 FTE)

- Guns & Ammo T&E (24 FTE)
- Special Ops RDA (127 FTE)

-Guns & Ammo PM
-Guns & Ammo Sustainment
-Guns & Ammo RDA } (39 FTE)

China Lake (4 FTE)

-Guns & Ammo RDA (4 FTE)

Dahlgren (83 FTE)

- Guns & Ammo RDAT&E (83 FTE)

Fallbrook (108 FTE)

- Guns & Ammo T&E (108 FTE)
- Guns & Ammo RDA (0 FTE)

Earle (67 FTE)

- Weapons & Armament PHS&T (67 FTE)

Indian Head (43 FTE)

- Energetics (43 FTE)

Louisville (172 FTE)

-Guns & Ammo RDA (132 FTE)
- OEM On-site support (12 FTE)
- Non-Guns functions (28 FTE)

**Picatinny
Navy Detachment**

Specialty Site for Guns & Ammo

**Functions in Green
Realign to Picatinny**

Legend: **Excluded by BRAC** **Realigned by BRAC**

Criteria: Government FTEs based on BRAC certified data. On-site contractor FTEs not included

Functional Statements

- **(G) Systems Integration Department**

- Functions as the Navy Integrated Specialty Site for Guns, Ammunition and PHST (Packaging, Handling, Storage and Transportation) to maximize the readiness levels of affordable and effective ordnance and combat systems equipment in the fleet by performing rigorous program management, in-service engineering, logistics support services and acquisition engineering

- **(GPO) Office of Program Management for Navy 2T Conventional Ammunition Systems (PM NCAS) *(Transitioned from NSWC Crane)***

- Provides comprehensive program management of 2T Cog (surface) ammunition

- **(G1) Naval Packaging, Handling, Storage and Transportation (PHST) Division *(Transitioning from IHD NSWC Det Earle)***

- Provides Fleet, Program Managers, and other customers with complete life cycle engineering and logistics support services for PHST of weapons and combat systems equipment

- **(G2) Conventional Ammunition Division *(Transitioned from NSWC Crane)***

- Provides Fleet, Program Managers, and other customers in-service and acquisition engineering support for Navy Conventional Ammunition

- **(G3) Guns Division *(Transitioning from NAWC WD China Lake and NSWC PHD Detachment Louisville)***

- Provides Fleet, Program Managers, and other customers with integration, testing, evaluation, in-service life cycle engineering and logistics, acquisition engineering, maintenance engineering and direct fleet support for naval gun systems

BRAC Gun Systems

NAVSEASYSCOM GUN SYSTEMS IMPACTED BY BRAC

Platform	Gun Weapon System	Ammo
DD-21 Land Attack Destroyers	Advanced Gun System	155mm
DDG-51 Arleigh Burke destroyers	MK 45 Light Weight Gun Mount (LWGM)	5 inch 54 Caliber
DDG-51 Arleigh Burke destroyers	MK 45 Mod 4 Gun System	5 inch 62 Caliber
USCG National Security Cutter (NSC)	MK 110 Mod 0 Gun System	57mm
Litoral Combat Ship (LCS)	MK 110 Mod 1 Gun System	57mm
CG-47 Ticonderoga Class Cruisers	MK 45 Mod 4 Gun Weapons System	5 inch 62 Caliber
FFG-7 Frigates	Mk 75 Gun System	76mm
USCG High Endurance Cutter WHEC-715 Class		
USCG Medium Endurance Cutter WME-901 Class		
CG 47, LSD 41, LSD 49, LPD 9, PC (USN and USCG), FFG, LHD, LHA, LCC and DDG 51 class ships.	MK 38 Gun System	25mm
Multiple, including: CVN, CG, DDG, DD, FFGs LSD, LHD, LHA's	MK 15 Close In Weapons System (CIWS)	20mm
Land Based (Deployed in Afganistan and Iraq)	Land Based PHALANX Weapons System (LPWS)	20mm
	SeaRAM	Rolling Airframe Missile
Multiple	MK 11 Saluting Mount	40mm
LPD-17 San Antonio Class Amphibious Assault Ship LCS (Mission Module)	Mk 46 Gun Weapon System	30mm
PC-1 Cyclone Class Patrol Costal Ships	Mk 96 Gun Weapon System (M242 Automatic Gun)	25mm
Candidate PC Costal	MK 51 Stabilized Weapon System M230 Cannon	30mm x 113mm

BRAC Gun Systems

NAVAIRSYSCOM GUN WEAPONS SYSTEMS IMPACTED BY BRAC

Platform	Gun System	Gun Pod	Ammo
Hornet F/A-18	M61A1 M61A2	M61 Palletized	20mm
Harrier AV-8B	GAU-12	A/A49E-10	25mm
Cobra-AH-1	M197	NA	20mm
KC130	Mk44 Bushmaster	NA	30mm x 173
H60C	M230	DAP Mount	30mm
H60C	RAMICS Mk44 Bushmaster	RAMICS	30mm



US Army Munitions Requirements

-- ASAALT/PEO Perspective



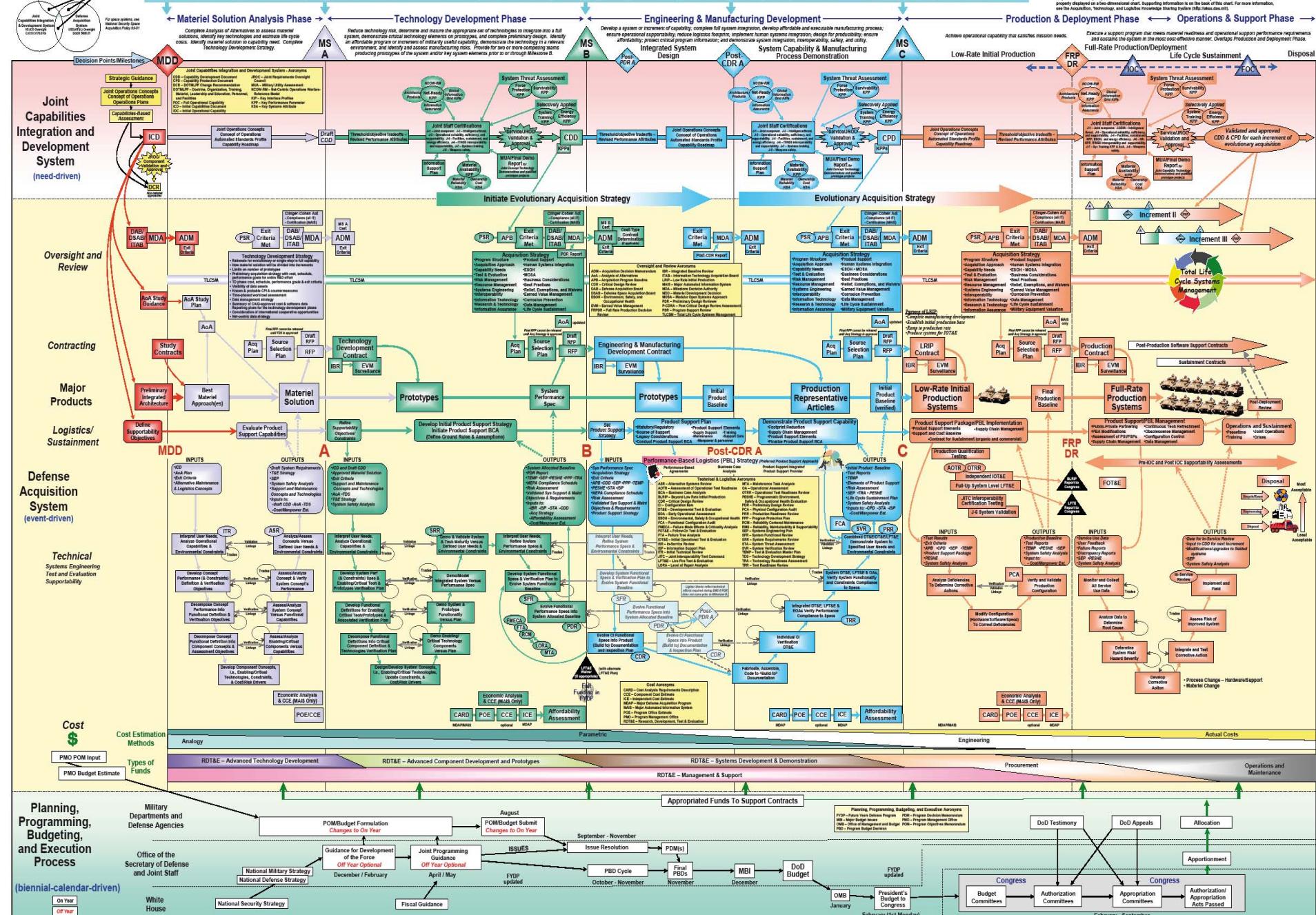
2010 NDIA Munitions Executive Summit

February 9, 2010

Jeffrey C. Brooks
Deputy Director for Ammunition
Munitions Systems Directorate
Office of the Assistant Secretary of the Army
Acquisition, Logistics, and Technology
703-604-7212, jeffrey.brooks@us.army.mil

Integrated Defense Acquisition, Technology, and Logistics Life Cycle Management System

Following the Materiel Development Decision, the Milestone Decision Authority may authorize entry into the acquisition process at any point, consistent with phase-specific entrance criteria and statutory requirements





MISSION

**Develop and Procure Conventional and
Leap-Ahead Munitions to Increase
Combat Power to our Warfighters**





It's the Budget System - PPBES

Planning – G3

Programming – G8

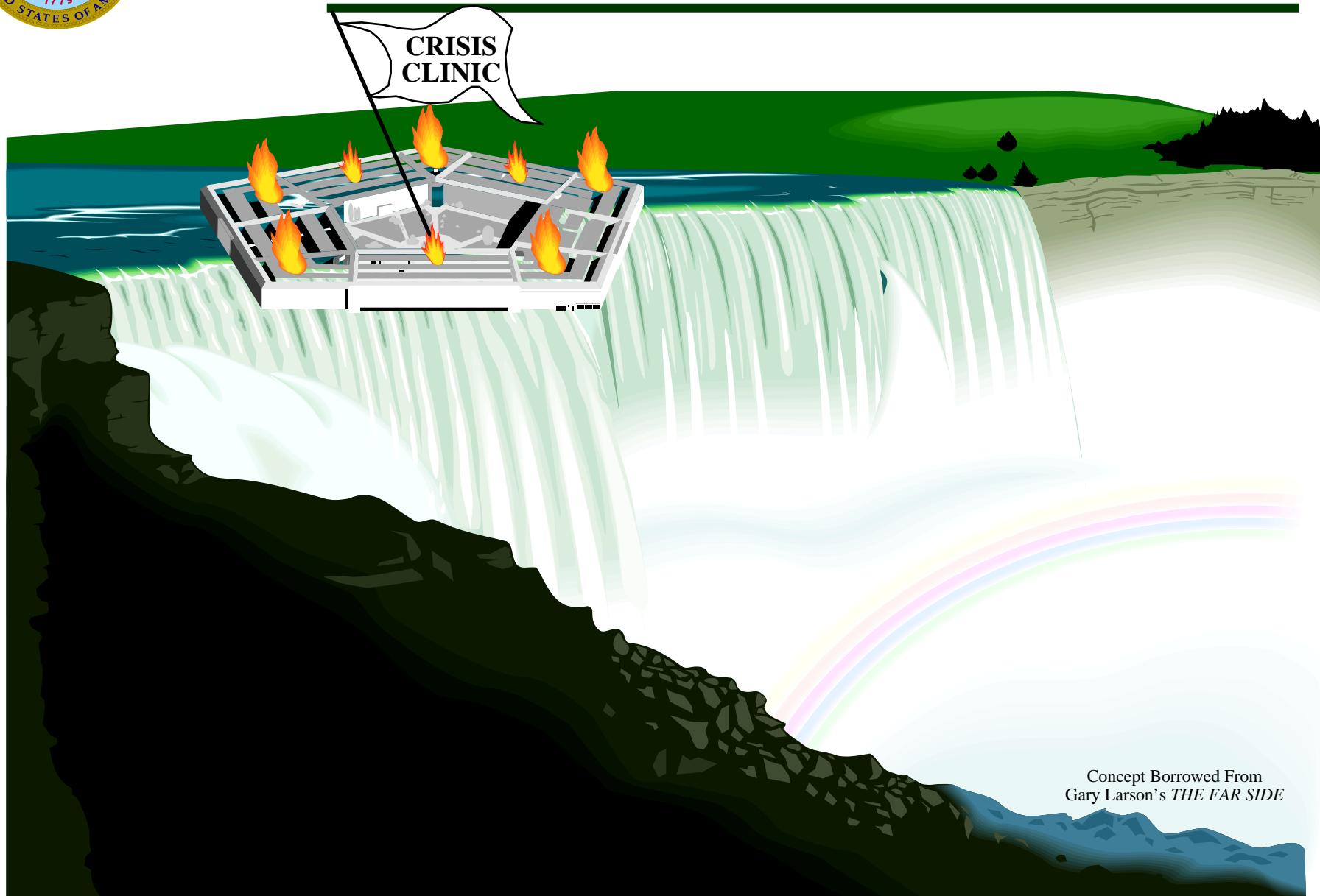
Budgeting – ABO

Execution – ASAALT & G4

- ✓ **Distinct Responsibilities**
- ✓ **Day-to-Day Interaction & Support**

FOCUS ON





Concept Borrowed From
Gary Larson's *THE FAR SIDE*



ASA(ALT)

The Assistant Secretary serves as the:

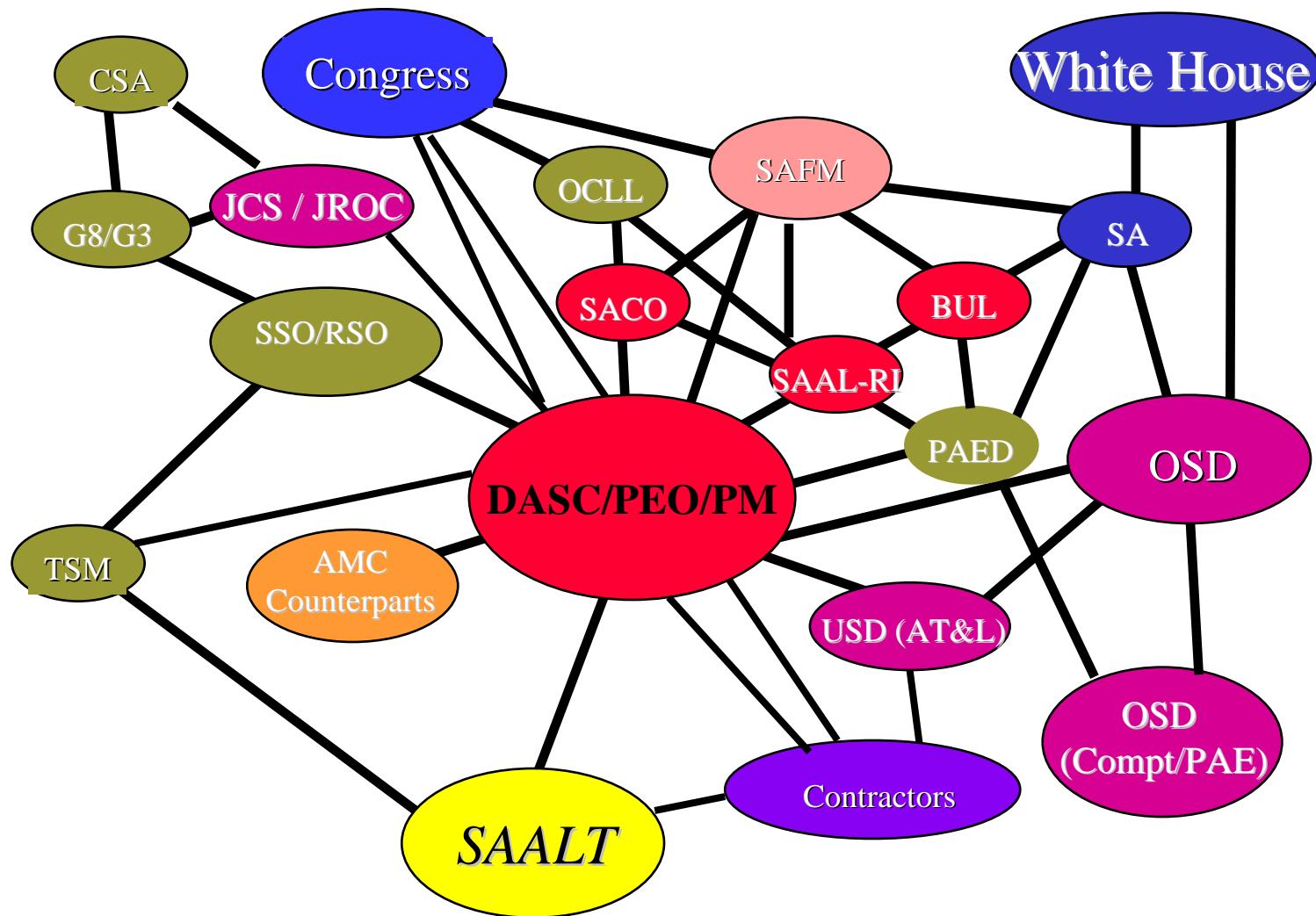
- Army Acquisition Executive
- Senior Procurement Executive
- Science Advisor to the Secretary
- Senior research and development official for the Department of the Army
- Principal responsible for all Department of the Army matters related to acquisition policy & logistics
- Single Manager for Conventional Ammunition

Mission:

- Execute the acquisition function and the acquisition management system of the Department of the Army.
- Advise the Secretary on all matters relating to acquisition and logistics management.
- Oversee the Army Industrial Base and Industrial Preparedness Programs.
- Ensure the production readiness of weapon systems.
- Exercise the procurement and contracting functions, the delegation of contracting authority, and the designation of contracting activities.



Interactions





PERSPECTIVE

350+ PAA Items of Ammunition

- Small Arms Ammunition – 12ga, 9mm, 5.56mm, 7.62mm, .50 cal, Non-Lethal, SESAMS, Tracer, Sniper, Frangible.
- Medium Caliber Ammunition – 20mm, 25mm, 30mm, 40mm.
- Mortar – 60mm, 81mm, 120mm (HE, Smoke, Illum – VL/IR).
- Tank – 105mm & 120mm (KE, HEAT, Multipurpose, HEP, Training, Canister)
- Artillery – 75mm, 105mm, 155mm (HE, DPICM, RAP, Smoke, Illum – VL/IR, Practice, Excalibur, Propelling Charges, Fuzes & Primers).
- Pyrotechnics – Simulators, Flares, Obscurants, Signaling, Impulse Cartridges.
- Demolitions – C4, TNT Blocks, Demo Kits, APOBS, Blasting Caps, Initiators & Igniters.
- Shoulder-Fired Rockets – AT4, BDM.
- Grenades – Hand, Training, Smoke, Vehicle Obscurant, Rifle Entry.
- Mines – Claymore, Volcano, Spider & IMS/Scorpion (and policy!)

- RDTE (PGK, AKE, IMS, A/GSTAMIDS), OPA (MFCS, LWHMBC, Spider, EOD), WTCV (Mortars). **Many Unique and Diverse Items*****



PEO Ammunition



PM Maneuver Ammunition Systems

- PM Large Caliber
- PM Small & Medium Caliber
- PM Medium Cannon Caliber



PM MAS equips soldiers, mounted and dismounted with all calibers of direct-fire ammunition for Army's Current, Stryker and Future Forces.



PM Combat Ammunition Systems

- PM Excalibur
- PM Mortars



PM CAS equips soldiers with all tube-launched, indirect fire munitions, and mortar weapon systems for Army's Current, Stryker, and Future Forces.



PM Close Combat Systems

- PM Countermeine and EOD
- PM Intelligent Munition Systems
- PM IED Defeat/Protect Force



PM CCS equips soldiers with networked assured mobility, force protection, and close battle systems for the Army's Current, Stryker and Future Forces.



PD Joint Services

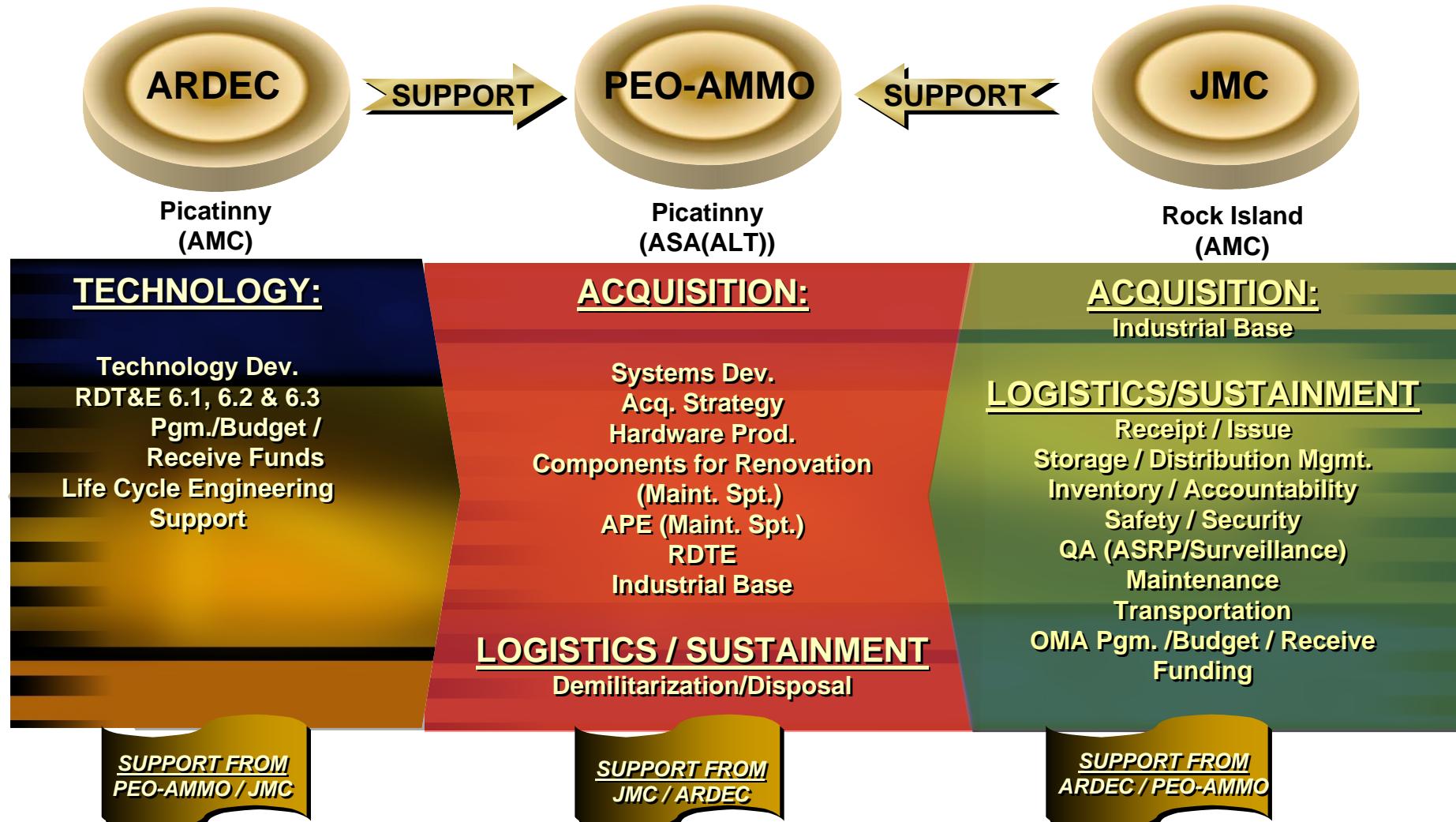
- PM Demil
- Industrial Base/EDCA
- SMCA -- Bombs/Navy Gun



PM JS integrates the SMCA mission; equips Services with Bombs and Navy Ship Gun ammunition; implements SMCA Industrial Base and Demil responsibilities.



Life Cycle Management Command





SUMMARY

- **Ammunition is a team effort**
- **Many small, unique items**
- **Focus on the Warfighter**
- **Life Cycle Responsibilities**
- **World-wide Management**



Project Director Joint Products

Munitions Executive Summit Acquisition Panel Brief

February 10, 2010

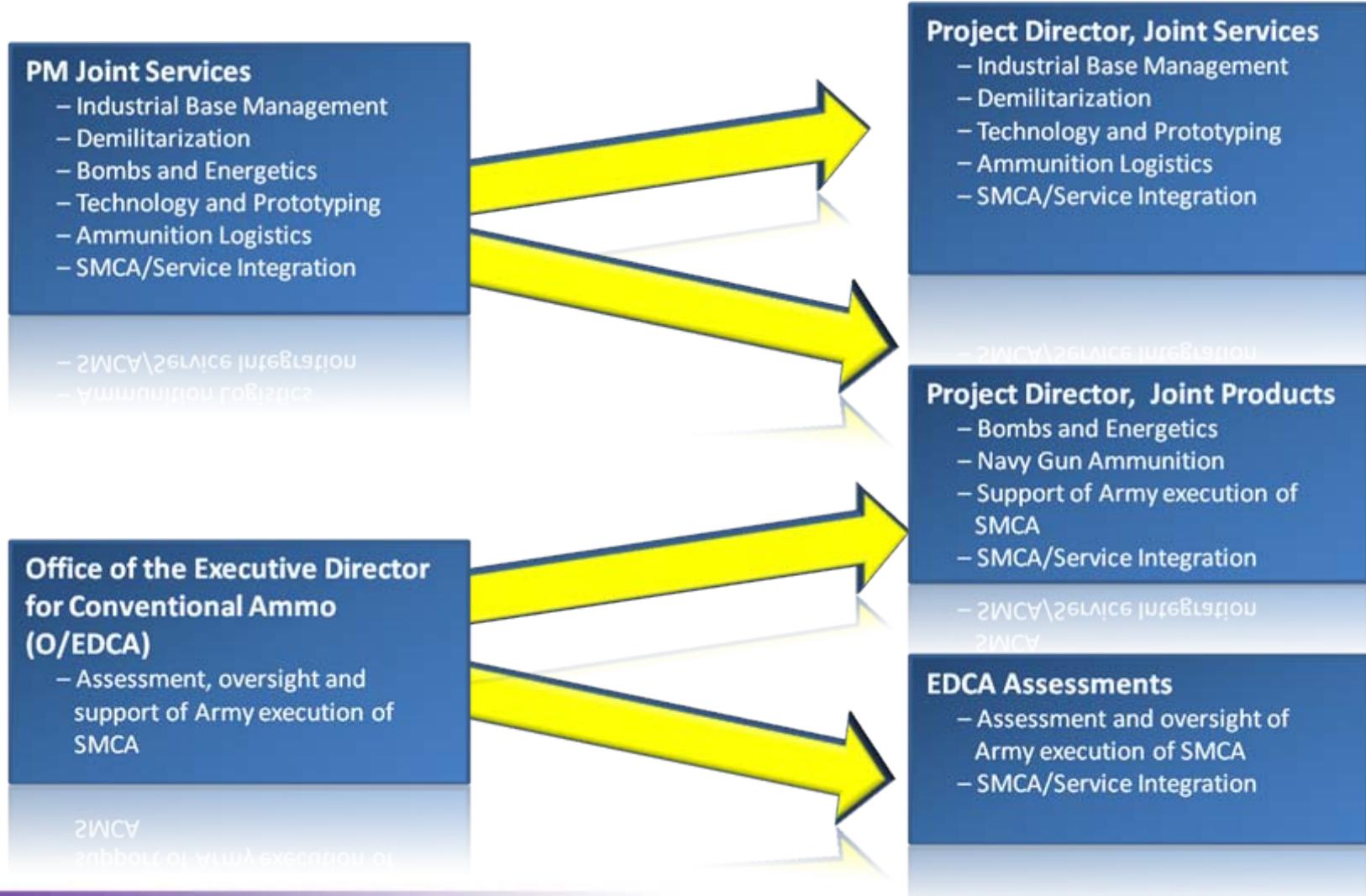
Col Kim R. Brooks
Project Director,
Joint Products
973-724-6487

kim.r.brooks1@us.army.mil



Project Director Joint Products

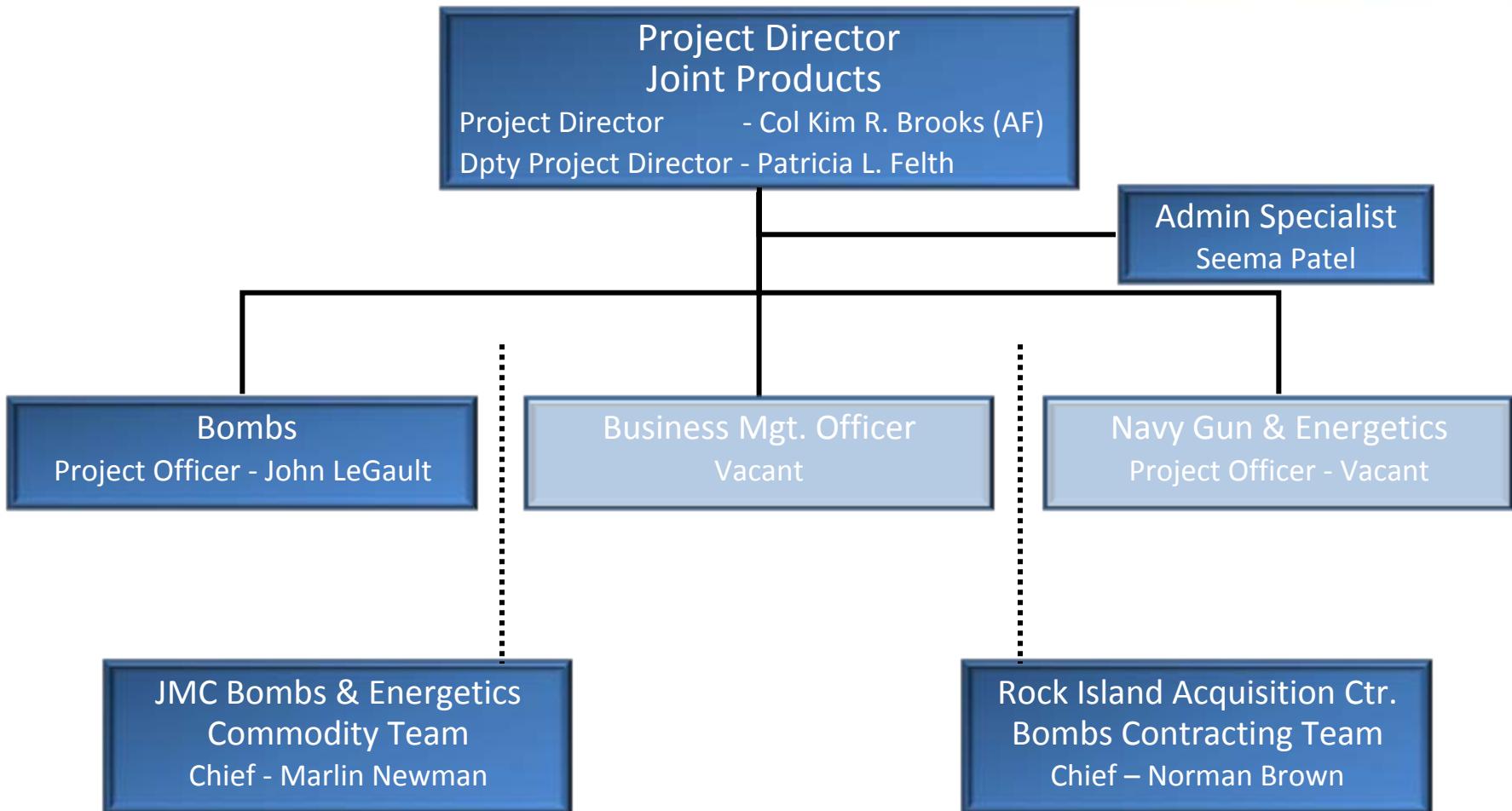
Origin of Organization





Project Director Joint Products

Organization Chart





Project Director Joint Products Portfolio



BOMBS (95% of FY10 funding)



MK80 Series
GP Bombs



Navy and Air Force
Practice Bombs



Navy and Air Force
Penetrator Bombs



CAD/PAD (2% of FY10 funding)

Cartridge Actuated Devices



Propellant Actuated Devices



NAVY GUN AMMO (2% of FY10 funding)



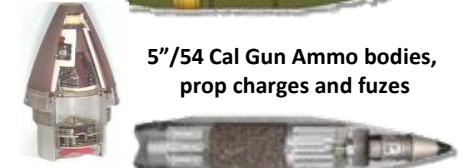
Navy Gun Ammo



Deck Gun firing 5"/54 Cal Ammo



76mm Gun Ammo



5"/54 Cal Gun Ammo bodies,
prop charges and fuses

ENERGETICS (1% of FY10 funding)

RDX



Formulate Finished Products



PAX-21



Comp C-4

HMX



LX-14



PBXN-9



Challenges: Aligning Industrial Base Capabilities with Joint Products Requirements and Resources



- Effect of Technological Evolution on existing Industrial Base

- Evolution to new explosives to meet Insensitive Munitions requirements



- ❖ Better performance and higher degree of Insensitive Munition compliance
- ❖ Need for new production processes and facilitization
- ❖ Explosive price increases → end item quantity reductions → workload below MSR

- Replacement of steel forged bodies with Cast Ductile Iron (CDI)



- ❖ Improved producibility, price and easier demil of training bombs
- ❖ Diversion of high volume workload from production base for tactical bomb bodies and LAP

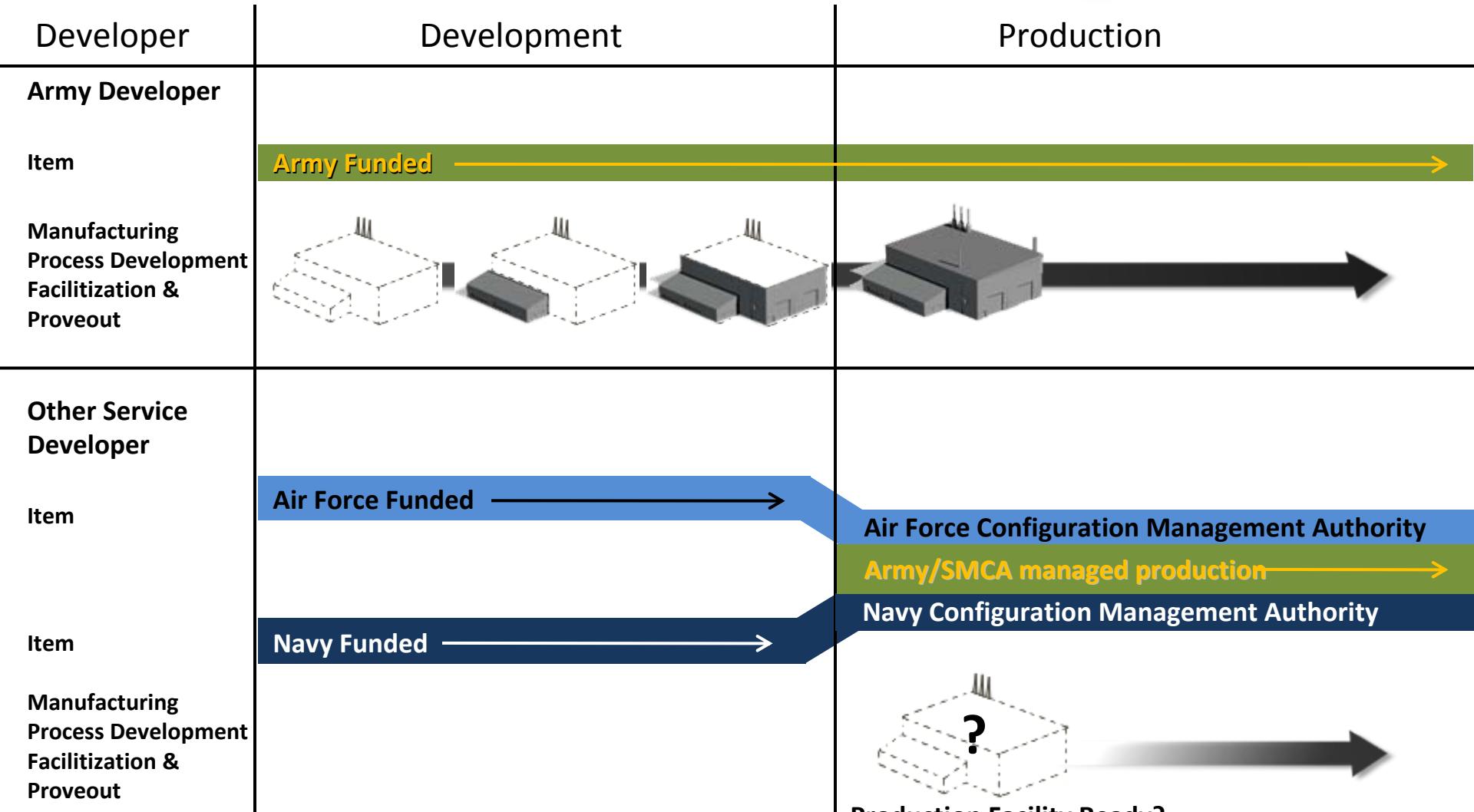
- Coordinating and Integrating new technical/design requirements among Other Service developers & Industrial Base producers



- ❖ Cross fertilization and synergy and commonality among new development programs
- ❖ Timely recognition and proveout of new production facility and process requirements



Challenges of Other Service Development Items Transitioning to SMCA Production





How Can Industry Help



- Be agile
- Be alert to changing requirements
- Realign capacity / capability to match known DoD plans, production volume
- Inform us of economic thresholds / minimum sustaining rates
- Price contract minimum quantity ranges realistically
- Be prepared to exercise shut down and startup procedures regularly
- Identify producibility / facilitization impacts of new developments / designs
- Communicate regularly

Bombs and Navy Gun Ammo Industry has been very helpful – Keep it up



Conclusion/Summary



- New PD Joint Products organization is designed to address key challenges
 - Air Force / Navy O-6 Project Director provides entry to Other Service Development communities
 - Provides intensified project management focus on Bombs and Navy Gun Ammo programs
 - Cultivates strong inter-Service communication links for planning and integrating production capabilities and capacities required for new and evolving munitions designs.

Congressional Budget Outlook

A Quick Look

\$ K M B T

CAUTION:
Eye charts
to
follow

2010 NDIA Ammo Summit
February 10, 2010

What We Know: It's election year!

(Feb '10)

- *Scott Brown – a primary, election preview?*
- *Deficit spending continues but under withering pressure* – “domestic spending freeze”, “pay/go” & taxes
- *Pressure to accomplish “change” continues*
 - *Scott Brown pivot? Jobs: “It’s the economy, stupid”*
 - *Health care in the background*
- *HASC Leadership Changes:*
 - *McKeon for McHugh (Sec Army)*
 - *Adam Smith for Abercrombie*

Watching democracy in action!!

What We Know

(Feb '10)

- International events shape environment & budget process
- Administration's agenda presumed defense savings
 - No 'war on terrorism' but defense at Bush funding levels
 - SecDef Gates staying worth percentage points of budget
- QDR details visible in POM12-17
 - From 2 "large-scale wars" to "small-scale wars on terror"
 - Congressional Review Panel – an alternative perspective
 - Inter-service competition will effect deliberations
 - Ammo remains an acceptable bill payer account

How long does $11/5 + 12/25 = 9/11 = \text{OCO\$?}$

2010 Congressional FY11 Budget Schedule

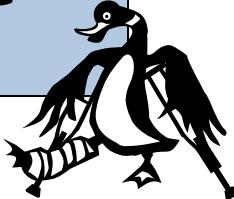
(Out early Oct for election)



*Lame Duck
possible if
change of
control*

2010 Congressional FY11 Budget Schedule

(Out early Oct for election)

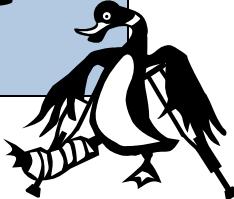


- Defense fights for floor time
- Congressional Budget Resolution: April 15
- Defense hearings start now:
 - Authorization bills: May-June
 - Appropriations bills: June-July
 - Defense Conferences: September
 - Possible CR for domestic agencies

Terrorist attack can completely change everything

2010 Congressional FY11 Budget Schedule

(Out early Oct for election)



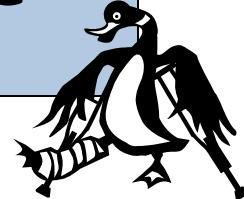
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**FY10 \$33B Supp:
Afghanistan & Haiti
Support by July**

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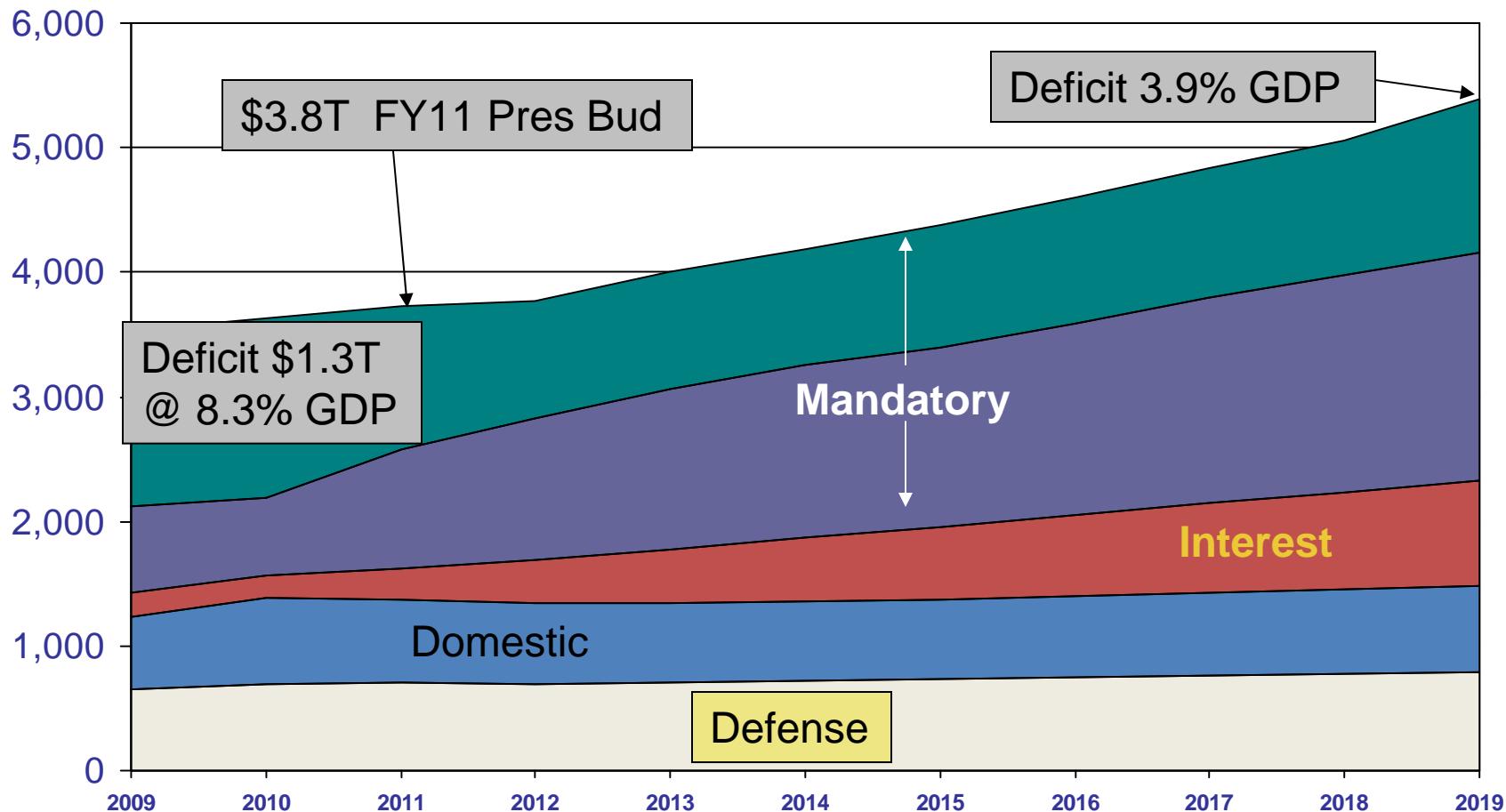
Primary results can ABSOLUTELY change everything:

Texas March 2nd California & Nevada June 8th

Terrorist attack can completely change everything

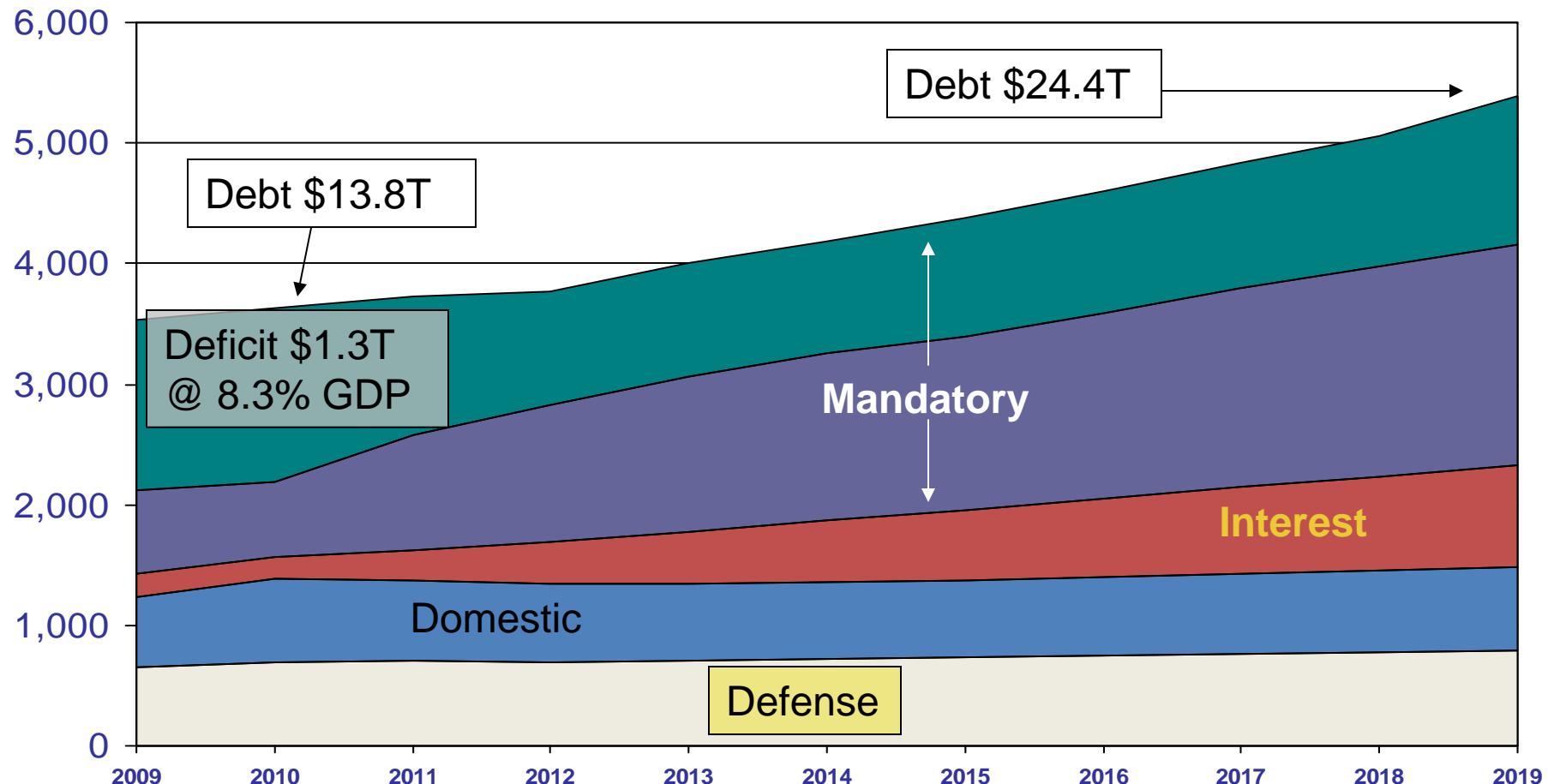
Federal Outlays & Deficit Estimate

Deficit, Mandatory, Interest & Discretionary (\$B) – Table 1-3/S-3



Federal Outlays & Deficit Estimate

Deficit, Mandatory, Interest & Discretionary (\$B) – Table 1-3/S-3

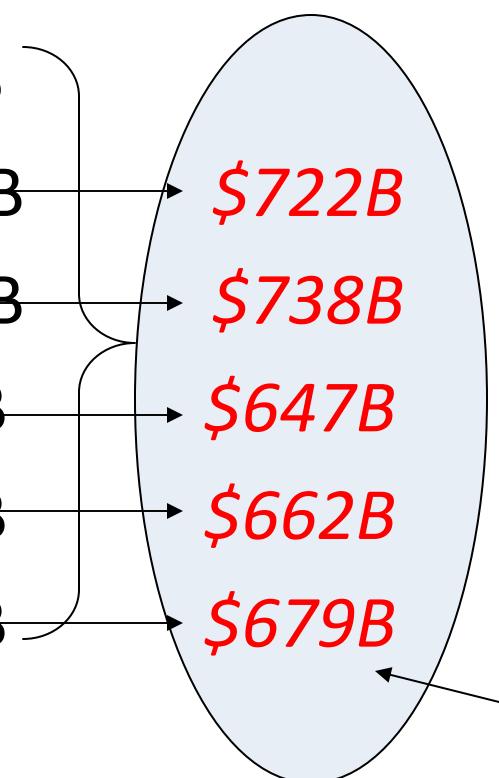


Fiscal Commission for Deficit Reduction

2009 Congressional Budget

- Congressional budget defense allocation for DoD and DoE (“050”) mirrored PB10:

- FY 09: \$693.6B
 - FY 10: \$691.7B
 - FY 11: \$619.8B
 - FY12: \$628.8B
 - FY13: \$639.5B
 - FY14: \$653.5B



**Administration's
1st year view of
savings with
“OCO persistent
conflict” (~-10%)**

And a domestic
spending freeze

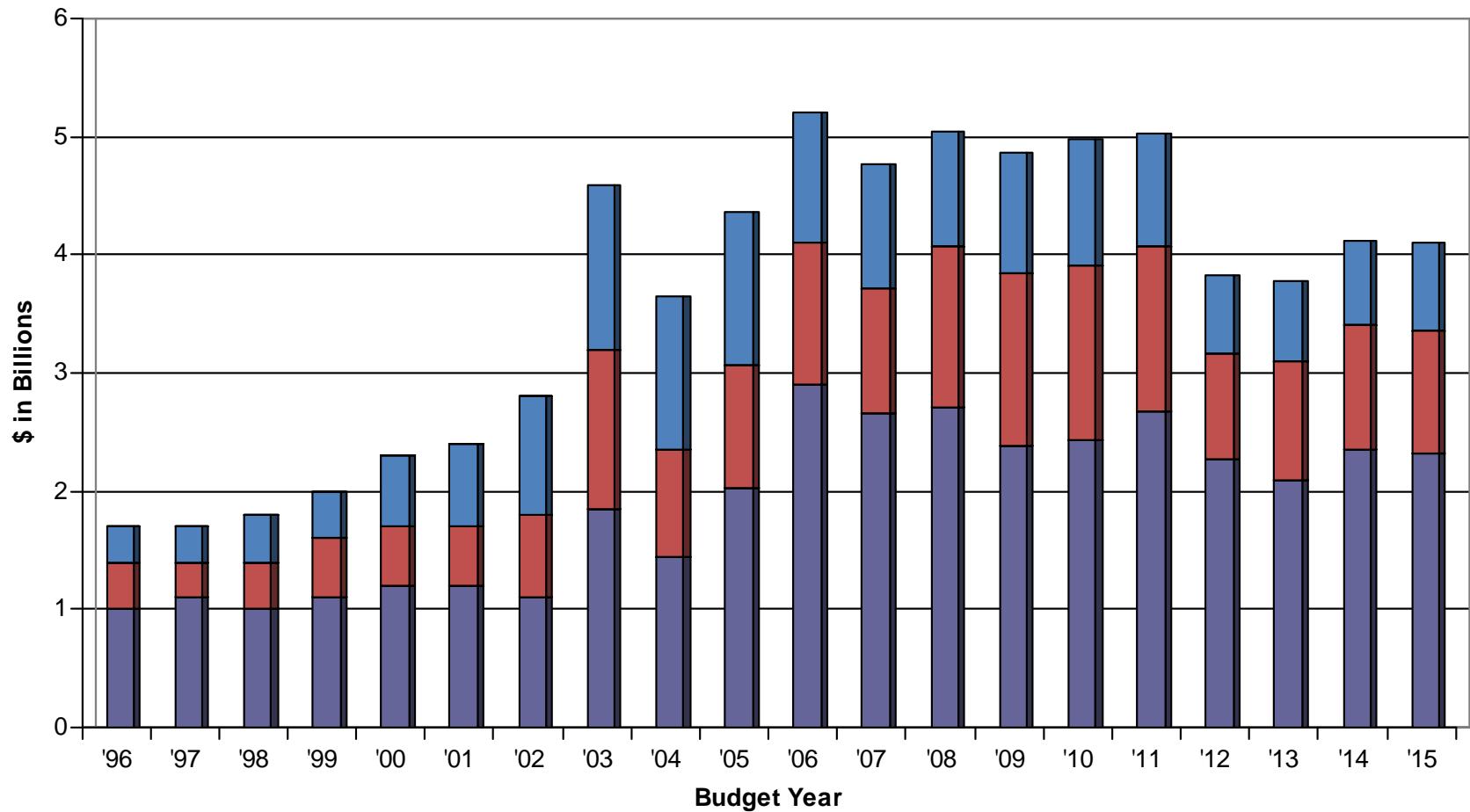
What I Think We Know?

(Feb '10)

- No one wants to be seen as weak on “defense”
 - BUT priority is elsewhere
- Responding to invigorated Al Qaeda could sustain elevated “OPTEMPO” and budgets
 - Persistent Conflict & OCO

Ammo Funding (\$B)

(no OCO\$ shown after '11)



■ APA ■ PA,N ■ PA,AF

What I Think We Know?

(Feb '10)

- No one wants to be seen as weak on “defense”
 - BUT priority is elsewhere
- Responding to invigorated Al Qaeda could sustain elevated “OPTEMPO” and budgets
 - Persistent Conflict & OCO
 - Persistent budget volatility or “business risk”
 - Down turn is moving to the right!
- Future administrations will be constrained by DEBT
 - “Soft Landing” looking more like “Risk Management” and asset redeployment

Administration needs Iraq/Afghan success to provide “capital” for its domestic agenda – tipping point over the next hill

What I Think?

(Feb '10)

- Watch the primaries – be involved!!
- Ammo program prospects unchanged from recent past
- SMCA's "implied" task is sustainment of a surge able production base for a portfolio of evolving PoRs
 - Challenge: "Implied" requirements in a requirements based budget process
 - Context: Portfolio Management & internal trade offs
 - *Management tools (IBAT and MSR data) available*
- Enterprise GOAL: " surge able" base (federation of programs) with fewer "single points of failure" for 2020 conventional and precision munitions portfolio

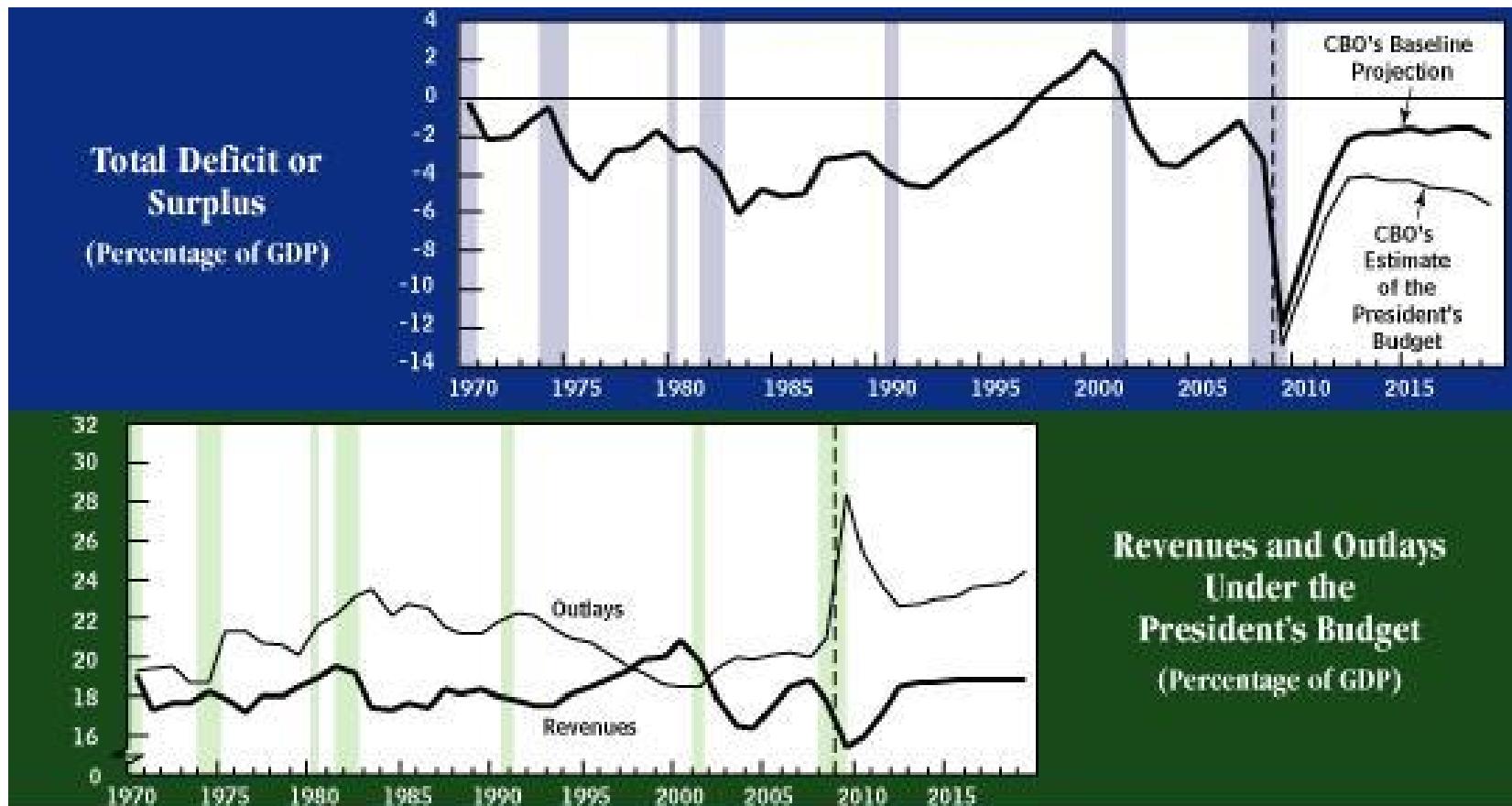
Incentivize (pay) MIB to establish 'elastic' production & management processes to lower sustainment costs??

QUESTIONS/DISCUSSION

Back Up Slides

CBO's View of FY 10 and Beyond

A Preliminary Analysis of the President's Budget and an Update of CBO's Budget and Economic Outlook



DOD (051) Budget Authority (\$B)

	2008	2009	2010	2011	2012	2013	2014
Pay	139	149	152 (+1)	154	142	146	150
O&M	256	272	297 (+20)	317	212	221	231
Proc (Ammo)	165 (5.4)	136 (5.0)	135 (+4) (5.1) (+0.02)	138 (5.0)	120 (3.8+)	124 (3.8+)	133 (4.1+)
R&D	80	80	81 (+2)	77	76	73	70
Other	35	31	26 (+2)	23	16	18	14
Total	675	667	693 (+33)	708	616	632	648
Supp / OCO	172 +16 MRAPS	146	163 (Supp +33)	159	(50)	(50)	(50)
Base	490	513	531	549	566	582	598

Volatility in OCO funding

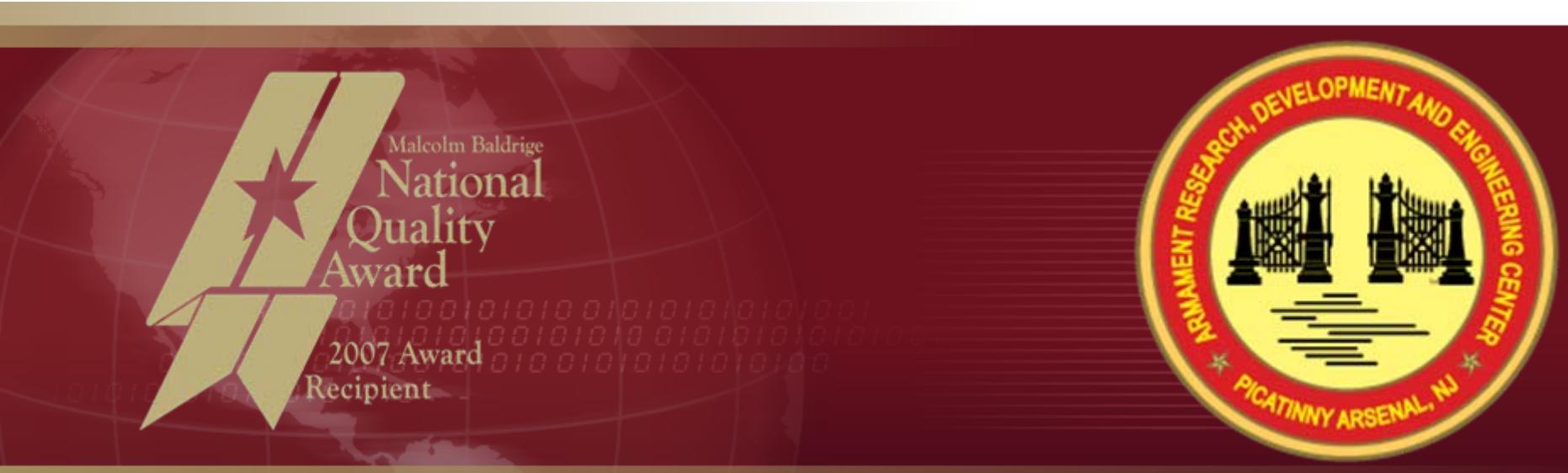
Procurement/R&D ratios now ~1.8:1 – NOT 4:1

Supplementals (\$B)

Year	FY06	FY07	FY08	FY09	FY10 (OCO)	FY10 (Supp)	FY11 (OCO)
Pay	16.4	18.9	17.8	17.9	14.2	2.7	15.3
O&M	71.1	94.7	91.6	81.7	90.9	21.3	116.9
Proc (Ammo)	18.0	45.4	54.8 (1.3)	29.2 (0.8)	23.2 (1.3)	8.0 (0.02)	25.4 (1.6)
Other	5.3	6.5	8.3	12.9	1.8	1.5	1.7
Total	115.8	165.5	172.5	141.7	130.0	33.0	159.3



**U.S. ARMY ARMAMENT RESEARCH,
DEVELOPMENT, & ENGINEERING CENTER
(ARDEC)**



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Technology Demands on the Future Industrial Base

Dr. Joseph Lannon

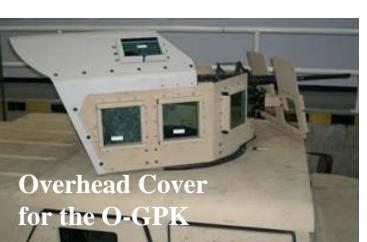
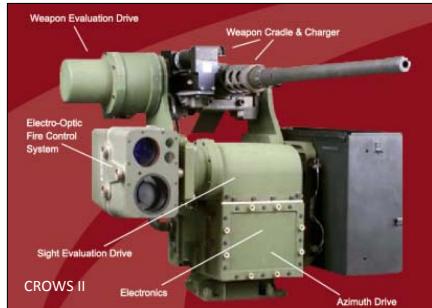
Director, ARDEC

Picatinny Arsenal, NJ

Bottom-line Upfront

- New technologies are being developed and new materials are being used that will affect the Industrial Base
- To successfully transition these new technologies and materials the Industrial Base needs to be prepared to manufacture these new technology

ARDEC MISSION & VISION



Vision:
Innovative Armaments Solutions for Today and Tomorrow.

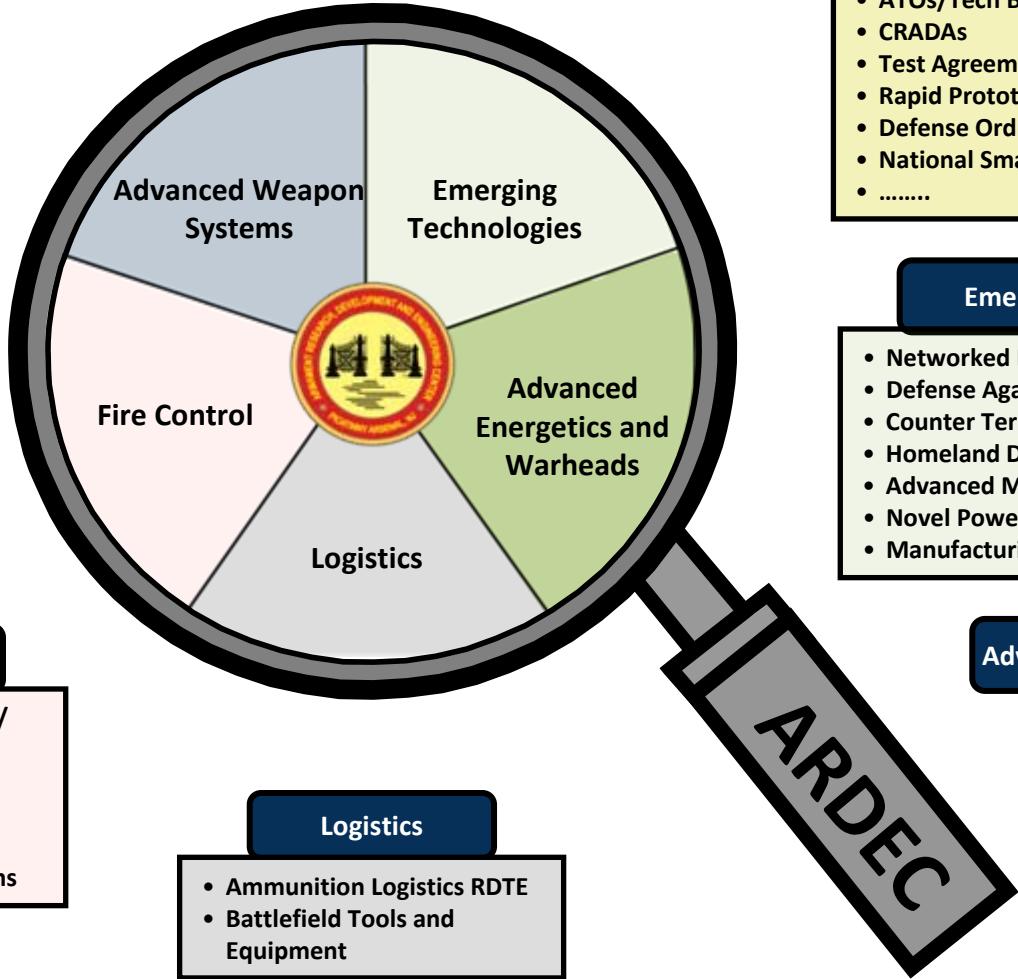
Mission:

To develop and maintain a customer focused, world-class workforce that will execute, manage and continuously improve integrated life cycle engineering processes required for the research, development, production, field support and demilitarization of munitions, weapons, fire control and associated items.





ARDEC Technology Focus Areas



Collaboration Mechanisms

- ATOs/Tech Base
- CRADAs
- Test Agreements
- Rapid Prototyping
- Defense Ordnance Technology Consortium
- National Small Arms Consortium
-

Emerging Technologies

- Networked Lethality
- Defense Against Unmanned Systems
- Counter Terrorism Technologies
- Homeland Defense Technologies
- Advanced Materials / Nanotechnologies
- Novel Power & Energy Systems
- Manufacturing Science Technologies

Advanced Energetics and Warheads

- Propellants
- Explosives
- Pyrotechnics
- Warheads
 - Kinetic Energy
 - Chemical Energy
 - Shaped Charges
 - EFPs
 - Fragmentation

New Technologies & Materials Needing IB Support



- Lightweight Small Arms Technologies (LSAT)
- Composite and Reactive Materials
- Nano Materials
- Coated Propellants
- MEMS Safe & Arm (S&A)
- Hyper X Chip
- In insensitive Munitions (IM)Energetics
- Electronic Assembly and Soldering

Lightweight Small Arms Technologies



• Cased Telescoped Ammunition

- Capacity to produce injection molded parts with high-grade polymers
- Modifications to existing ammunition load, assemble and pack facilities

Linked belt of CT Ammo



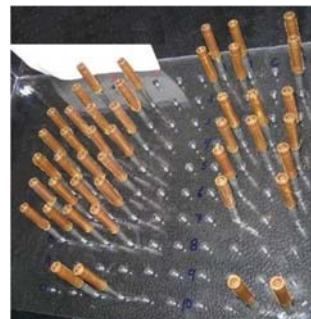
Injection molded components for CT

HMX Powder

• Caseless Ammunition

- Use of HMX-based propellant
- Mixing and molding of monolithic grain into near net shape, with tight tolerance for dimensions and density
- Significant change to load, assemble and pack process

Caseless Cartridge bodies drying on mold cores



Linked belt of caseless ammo

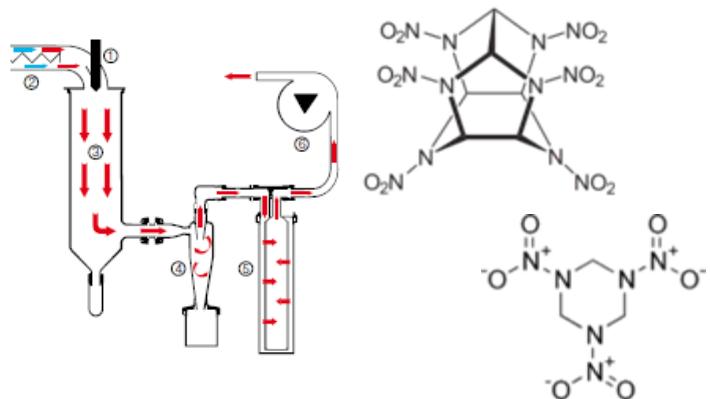
Scalable Technology for Adaptive Effects (STAR ATO)

- Scalable & Adaptive Munitions
 - Cost effective processes for Non-metallic & metallic structural composite projectile & munition components
- Nano & High Energy Explosives
 - Continuous Manufacturing Process for Improved Morphology & Lower Cost
- Coated Propellants
 - *Propellant Coating Processes* – precise coating control & consistency (thickness & coverage)

Composite Artillery Projectile



Sintered
Tungsten Alloy
Matrix



Sweetie Barrel &
Fluidized Bed
Coating of
Propellants

MEMS Technology

- Micro-Electromechanical Systems (MEMS) for munitions
 - Utilize metal micro-machining processes for gun-launch environment (not Silicon)
 - Integrating a micro-scale firetrain for fuzing applications
 - MEMS-based Safe and Arm (S&A) achieved TRL6/MRL7
 - Currently in EMD for MK19 40 mm HEPD application
 - MEMS S&A solicitation currently under technical evaluation
- Applicable to high-volume low cost applications or volume constrained systems
 - E. g. Medium cannon-caliber, Grenades, Precision artillery
- **A paradigm shift for the Fuze Industry**

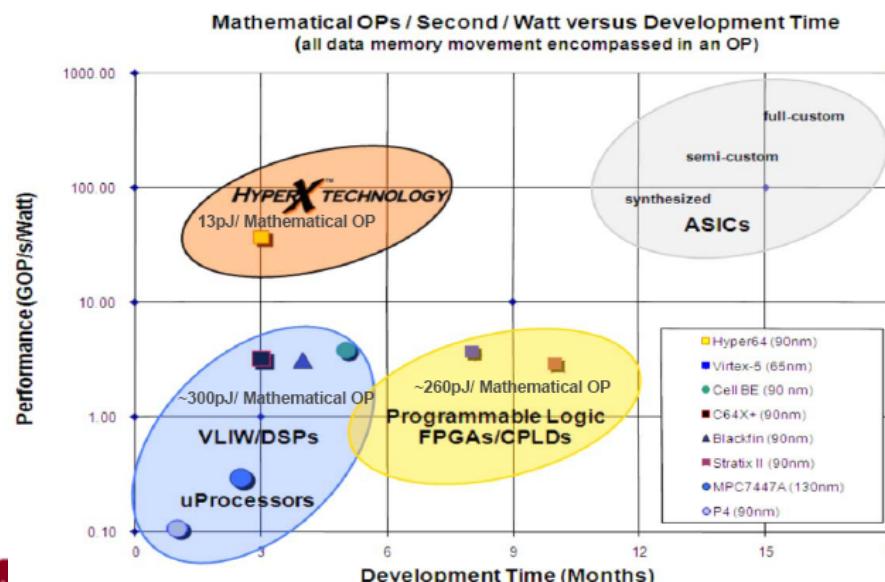
Traditional Approach - Watchworks used in Fuzes



HyperX Technology Platform

Key HyperX Advantages and Features:

- Internal power management
- Flexible computational power
- Ideal for multi-sensor fusion
- Easily reconfigured
- Rapid extensibility
- Good power to performance profile



System Uses

- Complex Computational Environments (Acoustic Sensors, multi-sensor networks, etc)
- Extended battery power applications (hand-held or man-wearable computers)

HyperX Drawbacks and Disadvantages

- Tools are still being developed
- Limited third party support of technology

Hybrid HyperX System



- **New In sensitive Munitions Formulations**

- Contain new novel ingredients requiring novel manufacturing technologies
- Significant changes to load, assemble and pack process
- Performance and Quality are strongly affected by minor process and formulation variations



**PAP-8386: Etherless
Propellant for 120 mm Tank
Training Rounds**



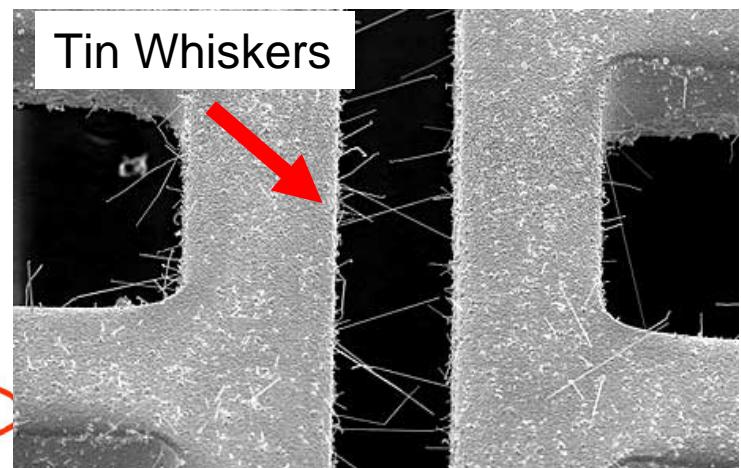
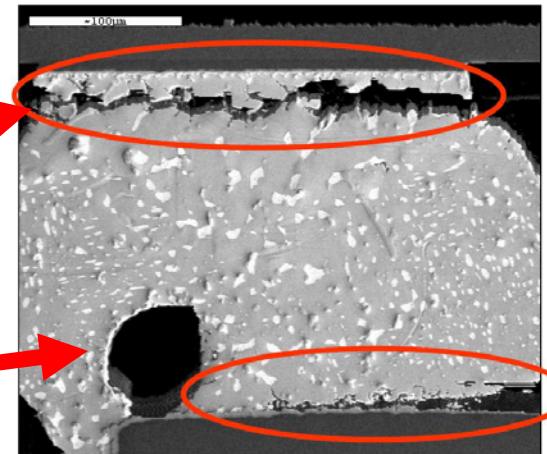
PAX 3

Electronic Assembly and Soldering

- **Solder technology is being driven to change by commercial industry (i.e. Reduction of Hazardous Substances – RoHS)**
 - RoHS compliance is forcing early obsolescence of tin/lead packages
 - RoHS paste formulas are evolving. All come with new reliability issues
 - Mixed solder processes (i.e. SnPb & Pb Free) create new reliability issues

Stress induced failure

VOID
(acceptable)



Summary

- New technologies are being developed and new materials are being used that will affect the Industrial Base
- To successfully transition these new technologies and materials the Industrial Base needs to be prepared to manufacture these new technology



US Munitions Industrial Complex – Readiness and Resource Perspectives



The “Theme”

**Perspectives on the US Munitions
Industrial Complex as they apply to
readiness issues from an
enterprise viewpoint.**



Panel Members

Mr. Donald Chrans, HQDA DCS G-8

Mr. Paul Heidenreich, VP/GM - Esterline Defense Technologies

COL Charles Kibben, Commander, Crane Army Ammunition Activity

CSM David Puig, JMC, Command Sergeant Major

Mr. Bill Sanville, Deputy PM, PM MAS



The Customers Perspective



Bottom Line Up Front

- Our Service Members have faith in the ammunition and ordnance that they carry and use.
- I never once doubted that when I engaged the enemy, the ammunition that I used was going to be effective and lethal.



The Korengal Valley





SFC Monti Medal Of Honor





Readiness Risks

- Our Service Members hold faith they will always receive the ammunition and ordnance they need, on time, every time.
- We owe it to our customers to never break that faith.



The Project Management Perspective

Project Manager Maneuver Ammunition Systems

Munitions Executive Summit



DPM MAS
William Sanville





New Administration Thrusts

—Push to achieve greater competition

- Less Sole Source contracts
- NTIB restrictions still OK
- Opportunities for new sources
- With more competition – Good proposals will be key

—Aggressive auditing by DCAA

- Auditors are no longer accepting issues as they have in the past
- Auditing is taking far longer than in the past
- IB: Needs to listen carefully to the DCAA and pay more attention to detail

—Risks PM's will be facing:

- New Sources
- Changes in contract types
- Unlimited or Government Purpose Rights



What's Next



■ Ammunition Inventories Replenished

- Stockpiles full and in some cases more than full leading to reduced buys in FY12-17**
- In general look for smaller buys**
 - Exceptions: High Priority Items like 30mm M789 & 40mm M430A1
- Some buys will be made to protect the IB but the IB must change to reflect the new warfighting reality.**
 - The Cold War IB is morphing to reflect todays realities.
 - Continuous to Batch Processing
- Significant improvements in effectiveness, reliability, etc can be reason to build additional rounds. Opportunities exist for improved munitions to fill a new War Reserve requirement**



Older Requirements

- **Old Requirements**
 - 20-85 Years old and some cases non-existent
 - Leads to inefficiency and in some cases inability to meet mission requirements
- **Current requirements don't always require defeat of modern well equipped forces**
 - No modern body armor defeat requirement
 - Current requirements don't take advantage of current technologies
 - Lightweight cases
- **PIPS vice new start R&D programs**



Government Ammunition Industrial Base Perspective

Joint Munitions Command's Mission

Make it

- \$2.9B in FY08

Demilitarize it

- 50,000 tons annually



Support it

- 6,000 Gov't personnel
- 7,285 commercial



Store it

- Value = \$42.1B

Train

- 35,000 annually
- distance, on campus and on-site



Inspect it

- 135,000 inspections

Manage it

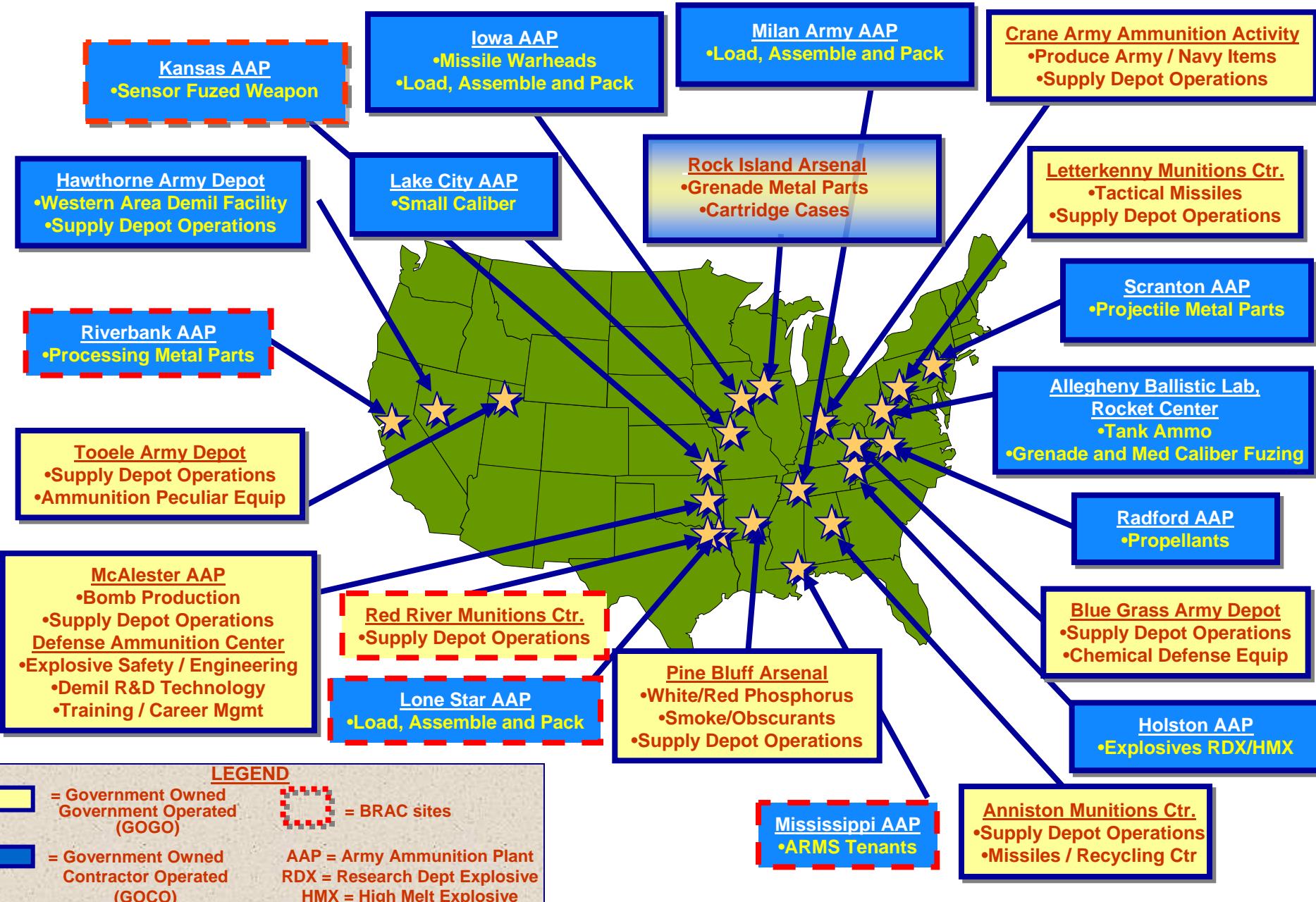
- 19 Gov't sites
- 154 commercial

Transport it

- Road
- Rail
- Air
- Sea



Government-Owned Facilities





Government Ammunition Industrial Base

Strategy:

- ✓ Continued modernization is critical to meeting National Military Strategy
- ✓ A steady state of resourcing avoids catastrophic production failures, supply disruptions, and improves operating efficiencies

Two imperatives:

- Steady-state funding for modernization
- Consistent workload, sufficient to sustain capabilities



Organic Base Logistics Capabilities



Ammo Power Projection Platform

Installations

	Storage	Daily outload
Blue Grass AD	1.8M sq ft	320 containers
Crane AAA	4.9M sq ft	302 containers
Letterkenny MC	1.7M sq ft	111 containers
McAlester AAP	5.2M sq ft	434 containers
Tooele AD	1.8M sq ft	338 containers



Ammunition Logistics Mission

- Joint Service contingency ammunition outload mission 450K tons in 16 weeks (approx 45 ships)
 - Support Air Force, Marine Corps, Navy, SOCOM training missions
 - Support 78 Army CONUS training installations
 - Store training and War Reserve ammunition
 - Explosives safety and security

Must be sustained to
Support the National
Military Strategy

Logistics Base Facts

11,000 ammo magazines
built in WWII \$10B
replacement cost



No commercial
ammunition
logistics capability
close to this order
of magnitude

Demil capacity 66k – 136k tons per year

Store 1.8M tons

Maintain/Renovate training and War Reserve ammunition
Unique explosives safety and security requirements

Anniston MC	1.7M sq ft storage
Hawthorne AD	5.6M sq ft storage



- Primarily deep stowage of excess/unserviceable ammo

Total: 22.7M sq ft = 473 Football Fields



Summary



Situation:

- Critical Capabilities are At-Risk
- National Military Strategy objectives will be at risk

What We Are Doing For Ourselves:

- Modernizing with available funds
- Using Lean Six Sigma Principles
 - Competitive Acquisitions
 - Strategic Planning
 - BRAC Implementation
- Optimizing ammo supply network

What We Need:

- Steady State of Funding to modernize
- Increased Funding for Demilitarization efforts
- Adequate Operations and Maintenance, Army Funding (vice Supplemental)
- Consistent Levels of Ammunition Procurements

Outcome:

Responsive, Reliable and Efficient Facilities that Provide Quality Ammunition that Meet the Joint Warfighter's Requirements



The Resource Management Perspective



Modernization Projects

Notional “1-to-N” Process



Factor Weighting

X

Evaluation Score: 1-3-9

X

Probability Score: 1-2-3

Project Priority

PRIORITIZATION FACTORS

- Operational Continuity & Quality 35%

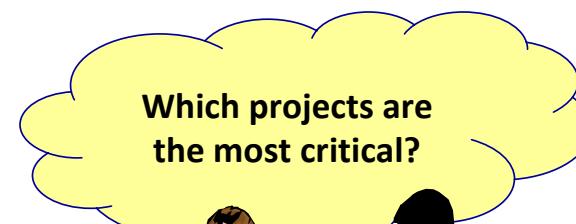
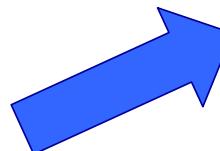
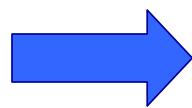
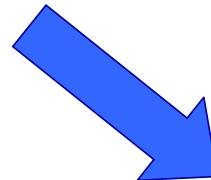
- Safety
- Environmental
- Financial Benefit
- Strategic Initiatives & Programs 10%

Highest Priority
Projects Done First

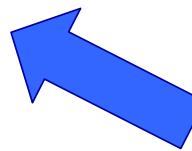
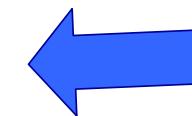
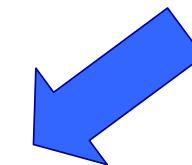
25%

15%

15%



JMC + PEO AMMO





Modernization Example

Lake City Army Ammunition Plant

5.56, 7.62 and .50 cal Small Arms Ammo



Output to the Warfighter !!

BEFORE – 400M rounds/yr



Vintage 1970s equipment
Buying replacement parts on Ebay
Quality limitations
Lack of safety equipment
WWII Final Inspection Equipment (Gage and Weigh)
Inefficient & unable to meet war fighter requirements

AFTER – 1.6B rounds/yr



\$219.2M funded (FY05-09)
Remaining Requirement \$114.1M (FY10-15)

Updated equipment
Enhanced quality
Safer operations
New test/inspection equipment
Improved efficiency and capacity



The Civilian Ammunition Base Perspective

2010 Munitions Executive Summit

February

U. S. Munitions Industrial Complex

- Readiness and Resource Issues

“an industry perspective”

Presented by

Paul Heidenreich

VP/GM - Esterline Defense Technologies

Readiness and Resource Issues

“an industry perspective”

KNOWLEDGE and CAPABILITIES

Tribal Knowledge
Retention
Critical Technical Capability
Increased R&D funding
Product Improvements

FORECASTS

2010 blind spot
Critical to planning
Critical to investing

DATABASE USAGE

IBAT/MSR, etc.
Next Step –
SMCA budget review

Today is better than the 1990's

Better Prepared
ICAP, MIBTF,
IBAT, MSR, etc.
Ammunition
Readiness
Rating, etc.

Industry/Gov't needs to work together

TEAMWORK/CULTURE

Ever Vigilant
IPTs, Teams
What is Next?

FLEXIBILITY

“Monuments”
Partnering/JV's, etc.
A bridge too far?
Long term commitment

BUDGETS, BUDGETS, BUDGETS

201x? – it will happen
Soft Landing or Hard Fall?
Running out of time



Questions or Comments?



Munitions Executive Summit PM Acquisition Panel Brief

PM Close Combat Systems

10 February 2010

COL Ray Nulk

Project Manager, CCS
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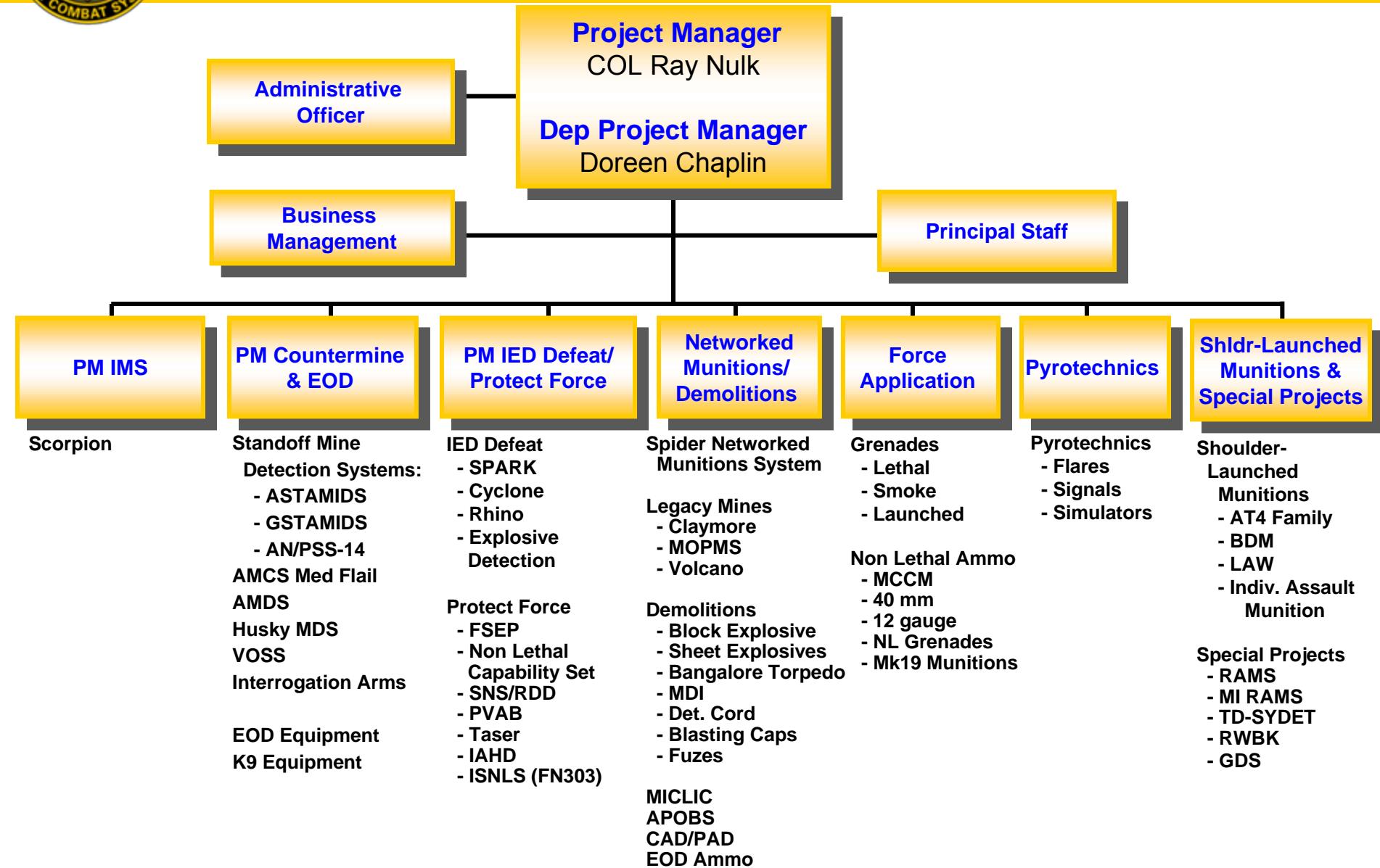
Ms. Doreen Chaplin

Dep. Project Manager, CCS
(973) 724-7573

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Organization – Product Alignment





PM Close Combat Systems

Product Lines

PM CCS Mission: Provide the Warfighter world-class close combat, force protection & assured mobility capabilities across full spectrum operations through professional, integrated Joint Life-Cycle Management.

- Networked Munitions
 - Spider
 - Scorpion
- Legacy Mines
- Countermine
- EOD Equipment
- K9 Equipment
- IED Defeat
- Grenades
- Pyrotechnics
- Demolitions
- Shoulder-Launched Munitions
- Non-Lethal Systems & Munitions
- Special Projects

<http://ccsweb.pica.army.mil>





Support to the Warfighter -OIF/OEF

Route Clearance



- **Vehicle Optics Sensor System (VOSS).** Locates IEDs / Trigger Man / threats at greater stand-off distance utilizing powerful daytime TV, night vision & thermal capabilities.



- **Husky Mounted Detection System (HMDS).** Detects & marks AT mines & underbelly IEDs in support of route clearance operations.



- **IED Interrogation Arms (IA).** Articulating hydraulic boom arm with digging attachments. Used on the RG-31 & Husky MPVs.



Area Clearance



- **Two types of commercial medium mine clearing flails** procured for the Air Force in Afghanistan (AROC 2003).



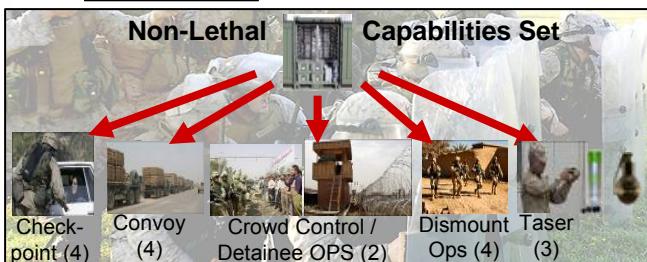
- **Berm Sifter.** ROTAR bucket sifter mounted on a Caterpillar front end loader. (Afghanistan AROC 2003)



- **AN/PSS-14 Mine Detecting Set.** Manportable metal detector & GPR. (Afghanistan/Iraq AROC 2003)



Support to the Warfighter - OIF/OEF



OIF

- Fielding new OIF SPARK – Working with reduced requirement; supporting over 600 IED Rollers
- Sustaining approximately 230 Debris Blowers
- Sustaining over 30,000 Rhino Systems
- Fielding & supporting Trace, Bulk explosive detection & cache detection (Ahura, Sherlock, Schonstedt)
- Fielding NLCS to units prior to deployment – Iraq & Afghanistan
- Sustainment activities at five locations
- Retrograde of Equipment

OEF

- Fielding an OEF-unique SPARK in Afghanistan, CDR US Forces Afghanistan #2 priority (#1 is MRAP) – supporting just under 400 IED Rollers
- Fielding Hand-Held Explosive Detection Systems
- Site surveys being conducted for Entry Control Points (ECPs) for 234 OEF FOBs – will increase due to surge
- Sustainment activities at four locations



Managing Non-Acquisition Programs

- Theater-based, defined procurement (JUONS, ONS, etc.)
- Operational requirements often lack analytical underpinning
 - THREAT Characterization often based on “snap shot”, not broad analysis
 - A perfect solution to an ONS/JUONS might be countered
 - Difficulties shaping and controlling S&T
 - LOTS of effort.....is it focused correctly?
- Contracting = time effectiveness vs. cost efficiency
- Long term funding stability
 - AR2B helps short term, POM funding difficult without Acquisition Program (AP) status
- Sustainment is responsive, but costly
- Training is not institutionalized
 - Continuity of equipment, TTPs, & standards between Schoolhouse, Home Station, Pre-Deployment Centers, CTCs, & Theater
- Proponency can present difficulties when seeking AP status
 - SPARK proponent is MANSCEN/EN Center, but SPARK use is NOT strictly EN



Support for Natural Disasters

- No one knows what documentation needs to be in place to execute
- Locating & forwarding assets to execute the request in a timely manner
- All issues associated with fielding equipment on a VERY tight timeline (Accountability, Training, Sustainment)
- Previously supported requests for Non Lethal Capabilities Sets during Katrina
- Current Requests
 - Non lethal Capabilities Sets – ARSOUTH request
 - Acoustic Hailing Devices – NAV request
 - Full Spectrum Effects Package – Request for single system currently undergoing testing
- NL Ammo provided in support of Operation Resolute Rescue (Haiti)
 - Request for Cartridge 40mm & 12-Gauge Non-Lethal Point & Area Control rounds

KATRINA



EARTHQUAKE
RELIEF
HAITI





What is Needed From Industry?

- Continued support of Best Value acquisition
- Award “family type” contracts
 - Support warm production base
 - Flexible/agile production capability
 - Dual use facilities...DoD & commercial
 - Allow for soft landing/ramp-up
- Understand operational pressures driving procurement strategies



Bottom Line Up Front

- Our Service Members have faith in the ammunition and ordnance that they carry and use.
- I never once doubted that when I engaged the enemy, the ammunition that I used was going to be effective and lethal.



The Korengal Valley





SFC Monti Medal Of Honor





Readiness Risks

- Our Service Members hold faith they will always receive the ammunition and ordnance they need, on time, every time.
- We owe it to our customers to never break that faith.

Project Manager Maneuver Ammunition Systems

Munitions Executive Summit



DPM MAS
William Sanville





New Administration Thrusts

—Push to achieve greater competition

- Less Sole Source contracts
- NTIB restrictions still OK
- Opportunities for new sources
- With more competition – Good proposals will be key

—Aggressive auditing by DCAA

- Auditors are no longer accepting issues as they have in the past
- Auditing is taking far longer than in the past
- IB: Needs to listen carefully to the DCAA and pay more attention to detail

—Risks PM's will be facing:

- New Sources
- Changes in contract types
- Unlimited or Government Purpose Rights



What's Next



■ Ammunition Inventories Replenished

- Stockpiles full and in some cases more than full leading to reduced buys in FY12-17**
- In general look for smaller buys**
 - Exceptions: High Priority Items like 30mm M789 & 40mm M430A1
- Some buys will be made to protect the IB but the IB must change to reflect the new warfighting reality.**
 - The Cold War IB is morphing to reflect todays realities.
 - Continuous to Batch Processing
- Significant improvements in effectiveness, reliability, etc can be reason to build additional rounds. Opportunities exist for improved munitions to fill a new War Reserve requirement**



Older Requirements

- **Old Requirements**
 - 20-85 Years old and some cases non-existent
 - Leads to inefficiency and in some cases inability to meet mission requirements
- **Current requirements don't always require defeat of modern well equipped forces**
 - No modern body armor defeat requirement
 - Current requirements don't take advantage of current technologies
 - Lightweight cases
- **PIPS vice new start R&D programs**

Munitions Executive Summit



10 February 2010

Presented by: COL Scott Turner
Project Manager for
Combat Ammunition Systems
973 724-2003,
john.scott.turner@us.army.mil



PM CAS Organization



PM Combat Ammunition Systems

PM, COL Scott Turner DPM, Mr. Rene Kiebler

973 724-2003

973 724-2110



PM Excalibur

PM, LTC Mike Milner
DPM, Mr. Matt Butler
973 724-3152



- Block 1a-1
- Block 1a-2
- Block 1b
- EPIAFS/PEFCS

PM Mortars

PM, LTC Norman Hilton
DPM, Mr. Pete Burke
(acting)



- Weapons and Fire Control
- Precision Effects
 - APMI
 - PGK

Conventional Ammunition

Mr. Martin Moratz

973 724-2245



- Artillery Ammunition
- Mortar Ammunition
- Energetics
- JMC Commodity Team

Advanced Systems

Mr. Paul Manz

973 724-2245



- Tech Base Transition

Business Management

Ms. Maryellen Lukac

973 724-7106

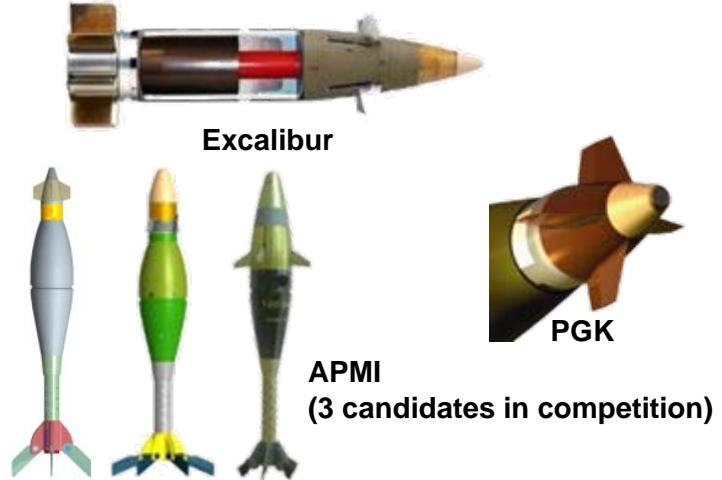


- RDTE/OPA/WTCV Branch
- PAA Branch
- Acquisition Planning Team
- Program Control Cell



PM CAS Family of Products

Precision Munitions



Artillery Ammunition 105/155mm



Mortar Platforms & Fire Control



Mortar Ammunition 60/81/120mm



Quick Stow



FY09 Contracting Summary

➤ Contracts Executed

- ✓ 19 New Contracts (\$91.6M) and 420 Modifications (\$581.8M)
- ✓ 113 Active Contracts and 80 Solicitations & Modifications

➤ Conventional Munitions Delivered

- ✓ 283,000 60mm Mortar Ctgs.
- ✓ 324,000 81mm Mortar Ctgs.
- ✓ 188,000 120mm Mortar Ctgs.
- ✓ 599,000 105/155mm Artillery Projectiles
- ✓ 52,400 Artillery Fuzes
- ✓ 971,420 155mm Artillery Prop Chg Increments



➤ Precision Munitions – 132 Excalibur Rounds

Executed 439 Awards Valued at ~\$750M
Delivered ~\$1 Billion in Ammunition



FY10 Contracting Projections

- Anticipate ~25% Increase in Modifications
- Anticipate ~100% Increase in New Contracts (~\$600M)
- Major FY10 Projected Awards:
 - ✓ SBSA IDIQ (Pica)
 - ✓ APMI UMR Production
 - ✓ 60/81mm HE/FRPC LAP
 - ✓ 60/81mm FRPC Fuzes & 120mm fins IDIQ
 - ✓ Mortar Ignition Cartridge & Burster LAP IDIQ
 - ✓ Supplemental Charges & Primer IDIQ
 - ✓ Large Cal Metal Parts IDIQ
 - ✓ MACS Ball Powder
 - ✓ M31A2 Propellant
 - ✓ M67 Prop Charges
 - ✓ Excalibur Engineering Services
 - ✓ Excalibur Production
 - ✓ PGK Production

Reflects Change to IDIQ Contracting Strategy



TC/FMR Activities

➤ FY09/10 Completed

- ✓ M1155A1 Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) - **FMR**
- ✓ M95 Mortar Fire Control System (MFCS) Version 4.1 Software Block 2 - **FMR**
- ✓ M915 Cartridge, 105mm DPICM (< 1% UXO) - **FMR**
- ✓ XM1066 Infrared Illum Projectile - **UMR & Follow-on**
- ✓ M821A2 81MM, High Explosive Cartridges - **FMR**
- ✓ M889A2, 81MM, High Explosive Cartridges – **FMR**
- ✓ M1155A1 EPIAFS (integrated on a Paladin) – **CMR**
- ✓ M1066 155mm IR Illum – **TC-STD**
- ✓ M150/ M151 MFCS (Mortar Fire Control System)/ MFCS-D Software v 5.0 – **FMR**
- ✓ M326 (Quick Stow) – **TC-STD & FMR**

➤ FY10 Planned

- ✓ XM1064 105mm IR Illum – **FMR**
- ✓ XM1122 155mm Affordable Training (M483 Reuse) – **TC-STD**
- ✓ XM1156 Precision Guidance Kit – **TC-STD**
- ✓ XM395 Accelerated Precision Mortar Initiative (APMI) – **UMR**
- ✓ XM982 Excalibur 1a2 - **FMR**



Precision Munitions Update

➤ XM982 Excalibur

- ✓ **Ia-1 Production Re-Start (Aug 09) – Produced 132 Projectiles / 116 Delivered to Theater (To Date)**
- ✓ **Ia-2**
 - SET-S & SET-P Completed
 - Reliability Assessment is 86%-93% (86% is "most-likely")
 - Operational Test Readiness Review (OTRR) – 2 Completed (Dec 09)
 - Configuration Steering Board (CSB) Completed (Dec 09)
 - OTRR – 3 Completed (5 Feb 10)/ IOTE (48 Rounds) in Progress (6 Feb 10 Start)
- ✓ **1b Upcoming Demonstration Test and Down Select (July 10)**

➤ XM395 Accelerated Precision Mortar Initiative

- ONS Approved (8 Jan 09)
- Demos Completed with Candidate Systems (May 09)
- AR2B GOSC UMR Approval Received (Jun 09)
- Three Competitive Contracts Awarded (Oct 09)
- Completed Kick-offs & CDRs
- Fired (200 each) Inert Rounds at Yuma Proving Grounds for Firing Table Development
- Shoot-off (25 each live rounds) in Progress (2-17 Feb 10)

➤ XM1156 Precision Guidance Kit (Increment 1)

- Completed Critical Design Reviews and Interoperability Demonstrations
- Demonstrated 50m Circular Error Probable (CEP) in Contractor Development Firings
- Successful Electromagnetic Environmental Effects (E3) Testing (Feb 10)
- On Track for Government Qualification Testing (May-June 10)
- Milestone C (July 10)



IM Saving Lives



SPC Alan Ng visits on 5Oct09



Insensitive Munitions in the Field

12 Sep 09

Specialist Ng was travelling in a Mine Resistant Ambush Protected (MRAP) vehicle when it was hit by a very powerful Improvised Explosive Device (IED). The IED ruptured the vehicle's hull and fuel tank, which engulfed the vehicle interior in flames—to include sixteen M768 60mm mortar cartridges that were carried inside the cabin with the seven-man crew. Although several soldiers were seriously injured in the ambush, all survived. Specialist Ng credited the Insensitive Munitions (IM) features of the M768 cartridges with averting a much greater disaster.



Exterior view of the MRAP after the fire.



Interior view of the MRAP after the fire. An unexploded shell body from a M768 cartridge can be seen.



Shell bodies and separated M768 fuses from M768 cartridges recovered from the vehicle after the fire.





Insensitive Munitions

Fielded

IM Features of MACS Worked effectively as designed to minimize overall reaction



OEF IED attack on a MRAP carrying 16 60mm High Explosive M768 Mortar Cartridges. The IM design features resulted in the fuze separating from the shell body preventing high order detonations thus saving the lives of the Soldiers.

Problems, Challenges & Risk

- Negating the Affects of Unplanned Stimuli During the Life Cycle of Munitions
- Developing IM Solutions to Meet Legacy Form/Fit/Function
- Passing IM Tests and Meeting Ballistic and Performance Requirements
- Developing Affordable Novel Technologies, Without Creating Single Point Failures, within the NTIB
- Integration with PM Program Schedules to Timely Field IM Enhanced Munitions

Threats

FUEL FIRE Such as a truck or an aircraft on a flight deck



NEARBY HEAT Such as fire in adjacent magazine store or vehicle.



BULLETS Such as small arms from terrorists or combat



FRAGMENTS Such as from bombs, artillery, or IEDs



SYMPATHETIC REACTION Such as detonation of adjacent stores



SHAPED CHARGE JET RPG, Bomblets, ATGMs: Combat or terrorists



Future/Emerging

Common Low-cost IM Explosive

- TNT Replacement – FY10
- Comp B Replacement – FY11

Passed Sympathetic Reaction without Barriers

IM Test:	FCO	SCO	BI	FI	SD	SCJI
Passing Criteria	✓	✓	✓	✓	III	III
TNT Baseline (M795)	III	III	IV	IV	(I)	(I)
IMX-101 (M795)	(V)	50E/hr (V)	(V)	6,000 ft/s (V)	(III)	(III)
Comp B Baseline (81mm)	(II)	(II)	(II)	(II)	(I)	(I)
IMX-104 (81mm)	(V)	(V)	(IV) (V)	(III) (IV)	(III)	(I)
	6F/hr	0.50 Cal 7.62mm	8,300 ft/s 6,000 ft/s			



M795 IM IMX-101 TNT Replacement Results





How Can Industry Help?

➤ Development

- ✓ Don't Bid Beyond Capacity to Execute
- ✓ Provide Realistic Proposals (Cost & Technical Maturity)
- ✓ Understand Increased Data Rights Sensitivity
- ✓ Don't Promote 'Technology' over 'Program of Record'
- ✓ Be Prepared for Developmental Competition
- ✓ Better APUC Fidelity
- ✓ Improved Vendor Accountability/Interface Control

➤ Production

- ✓ Don't Bid Beyond Capacity to Execute
- ✓ Improved Control of "Critical Processes" – Too Many Shutdowns
- ✓ Must Improve Critical Defect Responsiveness – Average is ~20 Days
- ✓ Improve Focus on Vendor Quality
- ✓ Continued Pursuit of Six Sigma Quality
- ✓ Support Government Quality Audits and Resolve Findings
- ✓ Aggressively Pursue Reduced O/H Rates



Summary

- **Supporting Overseas Contingency Operations (OCO)**
 - ✓ Respond to Operational Needs from Theater
 - ✓ No shortages on either operational and training ammo
 - ✓ Supporting needs of Coalition Partners and Allied Nations
- **Exceptional Customer Satisfaction**
- **Capability Improvements**
 - ✓ Continually drive to improve our ammunition/equipment and provide the Warfighter with better capabilities
- **Outstanding People/Develop Great Teams**





Back-Up





PM CAS Mission

MISSION

Perform Life-Cycle Management of
Tube-Launched Indirect Fire Munitions,
Mortar Weapons, and Mortar
Fire-Control Systems



PM CAS



GOALS

- Supporting the OCO
 - ✓ Respond to Operational Needs from Theater
 - ✓ No shortages on either operational and training ammo
 - ✓ Supporting need of Coalition Partners and Allied Nations
- Exceptional Customer Satisfaction
- Capability Improvements
 - ✓ Continually driving to improve our ammo/equipment and provide the Warfighter with better capabilities
- Outstanding People/Develop Great Teams



PM CAS Family of Products



Concept

Development

Production



Concept

Development

Production



PM-CAS TDP Scrub Summary

- The TDP scrub is a **complete review & update** of the TDP at the top drawing/round level, ending with a certification. It includes a review/update of **all drawings & specifications**, including **all components of the TDP**, to ensure that they are **complete, correct, current, concise and properly marked** with the appropriate distribution code. TDP components to be reviewed/updated as part of the detailed scrub include:

- ✓ Product, Packaging and Inspection Drawings/Documents
- ✓ Specifications and Standards
- ✓ Hazardous Component Safety Data Statements
- ✓ Outstanding Approved Engineering Changes
- ✓ Identification of any risks associated with the TDP, such as Single Point Failures (SPFs) and any equipment/materials that may be difficult to procure
- ✓ Development of 3-D Models
- ✓ Reduction/elimination of dimension & tolerance stack up
- ✓ Safety Critical Characteristics Review (SCC)
- ✓ Key Performance Characteristics (KPC)

Ongoing Scrub:

(completion Dec 2009)

- 155mm M549A1 HE RAP
- 81mm M821A2 HE
- 81mm M816 IR Illum
- 60mm M888 HE
- 60mm M769 FRPC
- 60mm M721 Illum

Completed Scrub:

- 60mm HE M720A1
- 81mm HE M889A1
- 120mm HE M933A1
- 120mm VL Illum M930
- M1 New Production with TNT



Continuously improved cyclical process including a training program to improve TD for all PM-CAS items



Post Award Conferences

➤ Post Award - Clarification of contract requirements

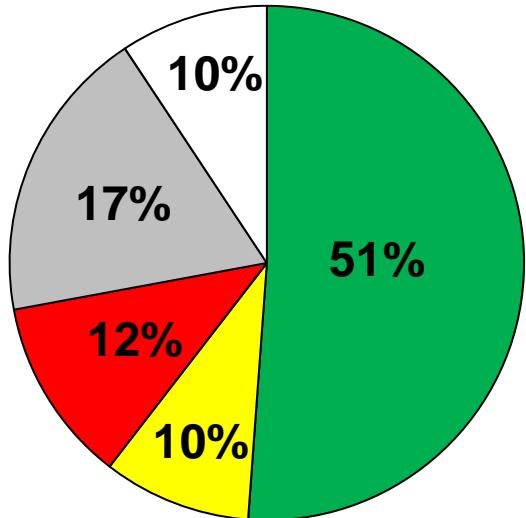
- ✓ Government expectations
- ✓ Education and training needed
- ✓ Critical Characteristic Control requirements
- ✓ Flow down of SCC requirements to subs
- ✓ Material certification requirements
- ✓ Audits of Suppliers, both prime and subs



Fully comprehend and comply with Contract requirements.



Independent Audit Status



Supplier Ratings		
Satisfactory <i>No findings</i>	22	Met or Exceeded Quality Management System controls for prevention of SCCs.
Satisfactory <i>Minor findings</i>	4	Isolated lapses in Quality Management System controls. Not likely to introduce non-conforming material into the supply chain.
Un-Satisfactory <i>Major findings</i>	5	Complete absence of a Quality Management System control.
Not yet Audited	8	Will audit [Some] out of [Total] this quarter
New Suppliers	4	

71 Audit events as of December 3, 2009

Planned Audits			
Crane AAA <i>(Crane, IN)</i> Visible, IR Candles	IMT <i>(Ingersoll, Ontario-CAN)</i> M931 120mm FRPC	GDOTS-Scranton <i>(Scranton, PA)</i> Artillery/Mortar Bodies	GDOTS-LeGardeur <i>(LeGardeur, Quebec-CAN)</i> Mortar LAP
Bluegrass AAD <i>(Richmond, KY)</i> Mortar Fins	Gayston <i>(Springboro, OH)</i> Mortar Fins	GDOTS-Valleyfield <i>(Valleyfield, Quebec-CAN)</i> MACS Energetics	Raytheon-NAPI <i>(Farmington, NM)</i> XM982 EXCALIBUR

Producer's Quality Systems verified at the factory floor.



Quality in the Supply Chain

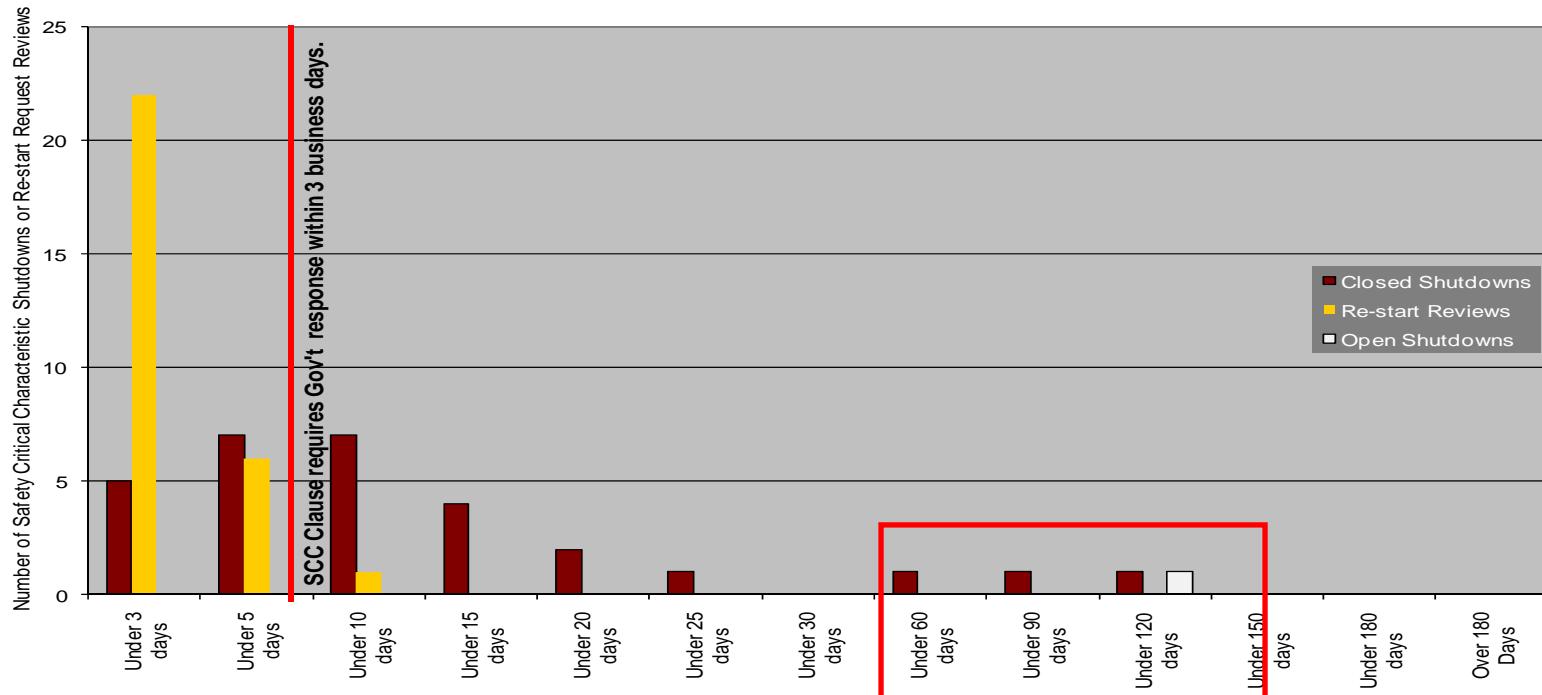
➤ SCC Shutdowns

- ✓ Quantified risk to vendor base
- ✓ Identified preferred risk mitigation tool (CPOA)

Shutdown Cycle Time
80% Re-Start w/in 20
Calendar Days

Government Review
96% Complete w/in 3 days

Production Lapses & Re-Start Review Times in Calendar Days

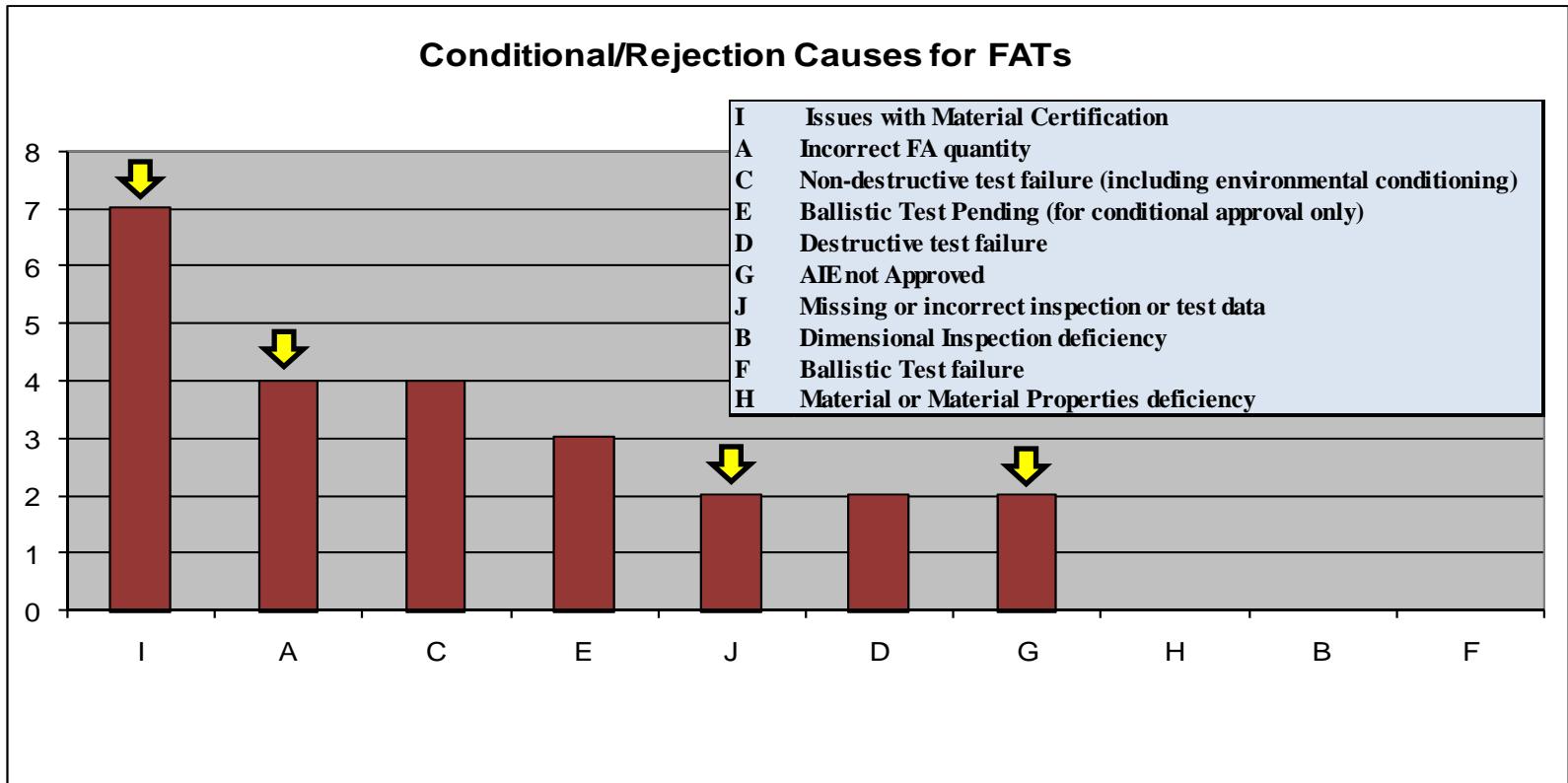




Quality in the Supply Chain

➤ FAT Acceptance

- ✓ Quantified pass rate (73%), and reasons for failure
- ✓ Better paperwork addresses around two-thirds of all conditionals or rejections





PM CAS Vendor Quality Day

- First Annual Meeting
- Robust Agenda
 - ✓ Lagging vs. Leading Quality Indicators
 - ✓ Technical Data Package Improvement Effort
 - ✓ Critical Characteristics Clause Implementation
 - ✓ CPOA Development Primer
 - ✓ Post Award Conferences (what to expect)
 - ✓ Automated Inspection Equipment Procedure Review
 - ✓ Quality Audit Process/Findings
 - ✓ First Article Test Procedure Checklist
 - ✓ Quality Metrics Review
 - ✓ MIL-STD-1168 Implementation Guidance
- Government panel to Address Questions/Concerns





Presented to:

MUNITIONS EXECUTIVE SUMMIT 2010

TECHNOLOGY DEMANDS ON THE FUTURE INDUSTRIAL BASE

*Approved for public release; distribution unlimited. Review completed by the
AMRDEC Public Affairs Office 4 Feb 2010; FN4414.*

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

9 FEBRUARY 2010



Presented by:

MR. PAUL E. TURNER

ACTING DEPUTY DIRECTOR
WEAPONS DEVELOPMENT AND INTEGRATION DIRECTORATE
AVIATION & MISSILE RESEARCH, DEVELOPMENT &
ENGINEERING CENTER

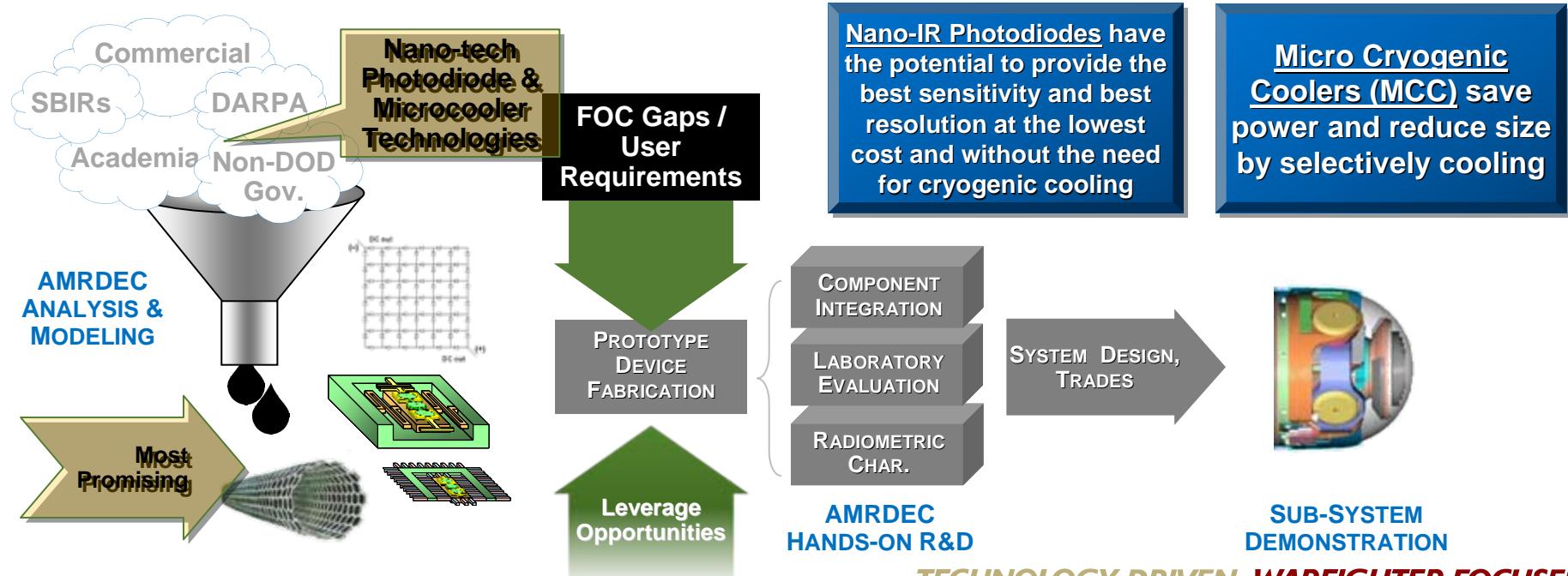
- BLUF
- Advanced IR Sensors
- Affordable Phased Array Sensor Systems
- Guidance Electronics Miniaturization
- Energetics
- Nanotechnology
- Conclusions

- Advanced IR Sensors
 - Industrial base for imaging infrared focal plane array technology is limited
 - Investments in new and innovative technologies are required
- Affordable Phased Array Sensor Systems
 - The APASS program focuses on affordability, achieving the goal by leveraging the commercial fabrication industry established by the telecommunications industry, and utilizing commercial parts where available.
 - Potential industrial base issues are Import problems, Availability of rare earth metals, and Challenges to a diminishing SME pool to develop required technologies such as thermal management techniques
- Guidance Electronics Miniaturization
 - MMC, Die availability, Die harvesting potential, Die redistribution to avoid stud-bumped die assembly, Minimum purchase quantities, Post assembly testing, ODP, Integrated imager/die package for pick-and-place, Low-cost imager (lens), and VCSEL die mass production
- Energetics
 - Solid Propulsion issues are driven by small production quantities, new performance parameters and environmental/safety issues
 - Gaps in Propulsion technology still exist
- Nanotechnologies
 - Safety in handling these items (Skin porosity)
 - Advanced production capabilities to maintain quality
 - Maintaining quantities

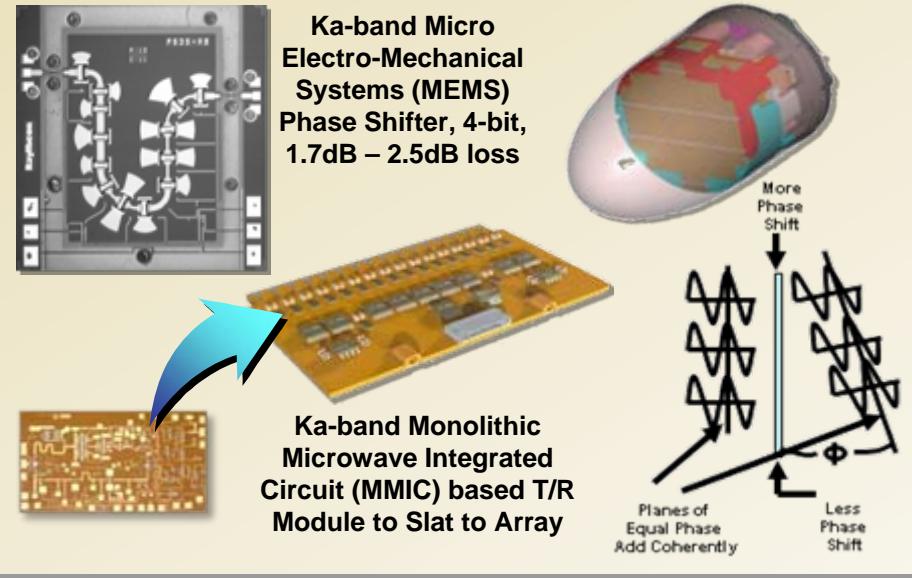
- **Next Great Idea for Advanced IR Seekers**
 - Supports Lower Cost Seekers and Increased Fidelity That Could Enable ATR (Quantum Det.)
- **Use of Nano/Micro Technology Allows Tailored Response**
 - Flexibility: Technology Core Solves Multitude of Problems (Benefits of Both Cooled & Uncooled)
 - Benefits of either MWIR and LWIR Using Common Design Framework
 - MicroCoolers Offer FastCooldown and Long Operation Period (Loiter Functions)
 - Multi-Mode Seekers: Passive Imaging, SAL, Taggant-Based Methods



- **Nano-IR Photodiodes are Immature**
 - Quantum Dot FPAs maturing
 - Devices have been demonstrated under less than optimal conditions
 - Measured results equate to less than 0.1% photon to electron conversion ratios
 - Improved photon absorption is required
 - Capacitance matching required
- **Micro-Cooler Technology Development**
 - DARPA effort holds promise
 - Sort out far-term potential and new concepts



- **Industrial base for imaging infrared focal plane array technology is limited**
 - **Quantities of military and commercial sensors are small**
 - Cooled and uncooled technologies are utilized by U.S Army missile and aviation applications
 - **Thermal detectors (uncooled infrared) are affordable but lack performance and design flexibility**
 - **Quantum detectors (cooled infrared) require closed or open cycle cooling to achieve desired performance**
 - **Export limitations have resulted in worldwide efforts to reduce or eliminate U.S. infrared dependence**
 - The U.S has lost it's technical advantage
- **Investments in new and innovative technologies are required**
 - **Alternative uncooled technologies for more improved performance and increased design flexibility**
 - Nano-scaled infrared photodiodes potentially allow quantum detection without cryogenic cooling
 - **Alternative cooling technologies for improved management of size, weight, power and array cooling**
 - Micro-cryogenic cooling potentially provides commercial and military users of imaging infrared with high performance cooled, quantum detectors in a solid state device package eliminating reliability issues of closed cycles coolers and shelf life of gas bottles



PURPOSE:

Develop advanced technologies for affordable phased array sensors for air and ground based systems including tactical seekers, fire control sensors and data links

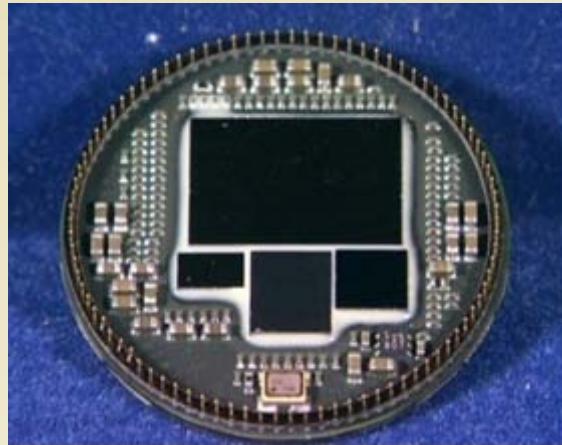
KEY ATTRIBUTES:

- Reduced array size and weight
- Gimbal elimination
- Reliability increased as much as 95%
- Eliminates the single point failure of conventional arrays
- Graceful degradation – can lose 14% of elements before experiencing performance slip
- Cost reduction of 50%
- Per system specific target sets
- Instantaneous beam reposition
- Ability to track multiple targets
- Increased performance
- Increased lethality

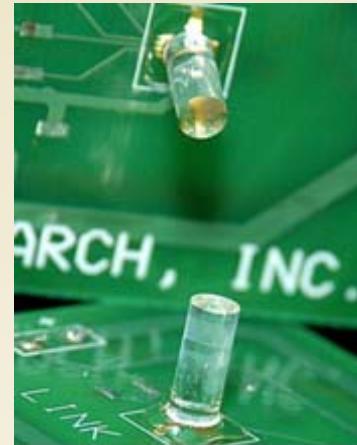
CHALLENGES:

- Power
- Sufficient for given target set, all solutions may not address most stressing target set
- MMIC design, fab and test at required power level
- Thermal
- Thermal management to address higher MMIC power levels
- Address unit cell junction temperature, integrated AESA, and final environmental temperature
- Strap-down Guidance Techniques
- Calibration
- Is in-flight necessary, or BIT adequate

- **The APASS program focuses on affordability, achieving the goal by:**
 - leveraging the commercial fabrication industry established by the telecommunications industry.
 - utilizing commercial parts where available.
- **Potential industrial base issues:**
 - **Semiconductor Issues**
 - Availability of rare earth metals for semiconductor fabrication (such as Gallium)
 - Import issues associated with both rare earth metals and semiconductor components
 - **Challenges to a diminishing SME pool to develop required technologies such as thermal management techniques**

**Miniature Mission Computer (MMC)**

DSP, FPGA, Memory
31.75 mm - diameter
3.0 mm - thickness

**Optical Data Pipe (ODP)**

High-bandwidth digital link
6.0 mm - square
5.0 mm - height

PURPOSE:

Develop, test, and transition miniaturized electronics technology to AMRDEC missile programs to decrease flight electronics weight, space, and power footprint

KEY ATTRIBUTES:

- Reduced size (up to 80%) and weight (up to 90%) for embedded computers, depending on design
- Reliability equivalent to standard PWB technology (MMC)
- Production Cost equivalent to standard PWB technology (MMC)
- Volume dependent
- Lower system weight and size (ODP)
- Reduce/eliminate connectors
- Reduce/eliminate wires
- Performance improvement (ODP)
- Wide misalignment tolerance
- High channel count allows redundant data paths
- 100+ channels @ 100Mbps/channel

GEM FOCUSES ON AFFORDABILITY RESULTING IN:

- Use of commercially available components and commercial manufacturing techniques and processes
- Ease of manufacturing / producibility through the use of commercial products and commercial fabrication base
- Leverages existing industrial base for fabrication and component processing:
 - Substrate design
 - Semiconductor components
 - PWB assembly and testing

IMPACT TO THE INDUSTRIAL BASE:

- MMC
- Die availability
- Die harvesting potential
- Die redistribution to avoid stud-bumped die assembly
- Minimum purchase quantities
- Post assembly testing
- ODP
- Integrated imager/die package for pick-and-place
- Low-cost imager (lens)
- VCSEL die mass production

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

LETHAL & SURVIVABLE

Insensitive Munitions



Gun Propellants



Rocket Propellants



- **Advanced Propellant Attributes:**
 - Increased lethality and precision targeting at all ranges with smaller, lighter munitions
 - Insensitive formulations enabling survivable weapons platforms in tactical & logistical use
 - Environmental & lifecycle compliance
 - Cost effective for long-term planned use
- **Advanced Propellant Critical Needs to Accelerate the Pace of Transformation:**
 - New chemistries
 - S&T to dynamically manage and tailor propulsive energy release
 - Underpinning S&T to break the paradigm between increased energy translating to increased sensitivity

CONSTITUTIVE MATERIALS

- Processable High Temperature Resins
 - high temp. performance without excessive cure temp.
 - good flow at room temperature
- Next Generation of Structural Fibers
 - high strength, stiffness, and impact resistance
- Oxidation Resistant Materials for Nozzles and Hypervelocity Missile Control Surfaces
 - toughened ceramics and ceramic matrix composites



Wound-in-place Nozzle



+



Fiber/Resin Characterization



High Temperature, Zero-erosion Nozzle Components



STREAMLINED PROCESSING TECHNIQUES

- Metallic and Ceramic Coatings for Hot Structures
 - rapid, high-quality deposition techniques
- Affordable Thermoplastic Fiber Placement for on-the-fly cure of fiber reinforced composites
- Integral Attachment Methods for Composite Structures
 - bonded/wound-in adapters (reduction of post-processing/assembly burden)



Thermoplastic fiber placement



Electrodeposited Rhodium-coated Pintle



Integrally-wound Motorcase Joint

ENABLING TECHNOLOGIES: net-shape fabrication techniques, high throughput fabrication methods for tactical, novel design approaches for high performance with improved producibility

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

- **Solid Propulsion issues – driven by small production quantities, new performance parameters and environmental/safety issues**
 - Availability of raw materials (obsolescence even before production)
 - Challenges to a diminishing SME pool to develop required technologies
 - Challenges to a diminishing production pool to make cases, nozzles, rocket propellant – all components of the propulsion units
- **Gaps in Propulsion technology still exist**
 - New EM ingredients for lower shock sensitivity, environmental-acceptability, improved aging, improved mechanical/physical properties, lower cost
 - New cases/ nozzles will face cost and performance and availability issues as well

- **Solid Propellants**
 - **Obsolescence may become the most critical aspect for Ems; Examples:**
 - BT – precursor to BTTN
 - AP – program requirements and environmental
 - Lead compounds – environmental
- **Inert components (nozzles, cases, throats); Critical materials:**
 - **Rayon**
 - **Carbon/Carbon**

AMRDEC Nanotechnology Research Initiative

CAPABILITY GAP	Longer munition mission timelines requires increased capacity and higher density storage batteries; Quick reaction munitions need higher power delivery.	Non-availability of miniature health-monitoring sensors to detect rocket motor propellant outgassing	Metal motor casings are heavy; replacing metal reduces electrical and thermal conductivity	Monomethyl hydrazine is not environmentally friendly	
SOLUTION	Develop MMME warhead with inertial sensor capable of target identification	Grow high surface area nanomaterials for super capacitors and thermal batteries; Develop hybrid systems	Develop mini devices capable of detecting nano-particle chemicals for weaponry health	Reduce weight and improve thermal management with nano-enhanced resins and fibers	Utilize tertiary amines and manipulate particle and pore size
TECHNOLOGY	SWFTICE (ATO)	NANOPOWER STORAGE	NANOSENSORS & NANOELECTRONICS	NANOCOMPOSITES	NANOENERGETICS
APPLICATIONS	<ul style="list-style-type: none"> TOW Javelin HELLFIRE JAGM NLOS-LS PAM 	<ul style="list-style-type: none"> PAC-3 (longer lifetime sources) KEAPS (energy storage capacitors) NLOS (power systems) 	<ul style="list-style-type: none"> RRAPDS (weaponry health) THAAD (hydrazine detector) MMMPSPMP 	<ul style="list-style-type: none"> Javelin (launch tube) Lightweight Launcher Motor Cases 	<ul style="list-style-type: none"> Gellants for Fuels of Bipropulsion Systems
ENDORSEMENTS	<ul style="list-style-type: none"> TRADOC USAISC PEO Missiles & Space <ul style="list-style-type: none"> CCWS JAMS NLOS-LS PFRMS USAFAF 	<ul style="list-style-type: none"> PEO Missiles & Space 	<ul style="list-style-type: none"> NAWC AMRDEC <ul style="list-style-type: none"> RRAPDS (Technology Base Program) SWFTICE (ATO) ASLCMC (ATO) 	<ul style="list-style-type: none"> PEO Missiles & Space <ul style="list-style-type: none"> CCWS JAMS 	<ul style="list-style-type: none"> PEO Missiles & Space AMRDEC <ul style="list-style-type: none"> MMMPSPMP (ATO)

KEY DOD PARTNERS



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

- Advanced IR Sensors
 - Industrial base for imaging infrared focal plane array technology is limited
 - Investments in new and innovative technologies are required

- Affordable Phased Array Sensor Systems
 - The APASS program focuses on affordability, achieving the goal by leveraging the commercial fabrication industry established by the telecommunications industry, and utilizing commercial parts where available.
 - Potential industrial base issues are Import problems, Availability of rare earth metals, and Challenges to a diminishing SME pool to develop required technologies such as thermal management techniques

- Guidance Electronics Miniaturization
 - MMC, Die availability, Die harvesting potential, Die redistribution to avoid stud-bumped die assembly, Minimum purchase quantities, Post assembly testing, ODP, Integrated imager/die package for pick-and-place, Low-cost imager (lens), and VCSEL die mass production

- Energetics
 - Solid Propulsion issues are driven by small production quantities, new performance parameters and environmental/safety issues
 - Gaps in Propulsion technology still exist

- Nanotechnologies
 - Safety in handling these items (Skin porosity)
 - Advanced production capabilities to maintain quality
 - Maintaining quantities



Ammunition Industrial Base Modernization Brief

for the
NDIA
Munitions Executive Summit
8-10 Feb 2010

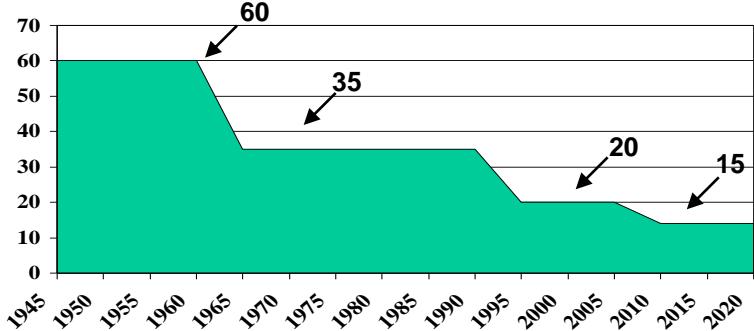
Matt Zimmerman
Deputy PM Joint Services
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Picatinny Arsenal, NJ 07806-5000
973-724-7626
Matthew.zimmerman1@us.army.mil



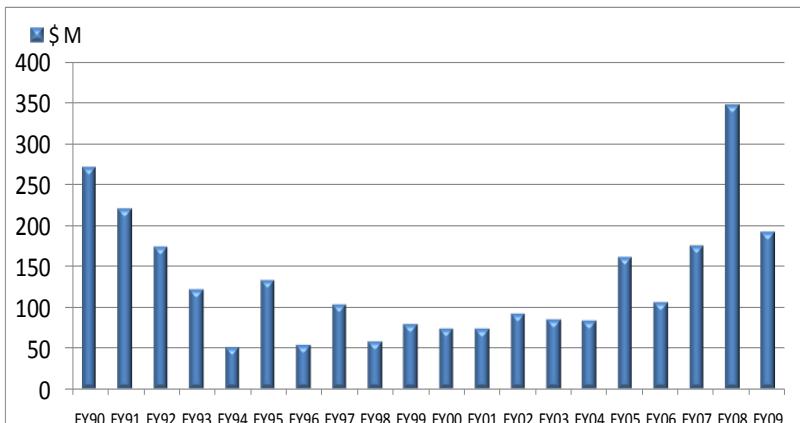
Ammunition Industrial Base Overview

Historical Background

Army Ammo Organic Facilities over time



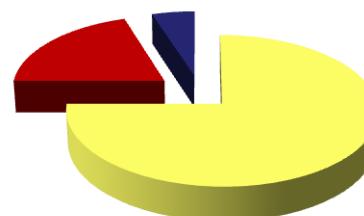
Desert
Storm Cyclical Modernization Funding OIF



Post 05 BRAC Industrial Base

- Commercial Suppliers: Principal Source of Ammunition:
 - 180+ Key Commercial Sources
- Supply Chain State:
 - 34 Critical Single Point Failures
 - 16 Mitigated
- Army Ammunition Facilities:
 - 6 AAPs (Radford, Lake City, Holston, Iowa, Milan, Scranton)
 - 1 Facility @ Rock Island Arsenal (Riverbank AAP BRAC Capability)
 - GOGO Ammunition Installations
 - 3 Army Multi-Mission Installations (Production and Logistics)
 - (Crane, McAlester, Pine Bluff)
- 5 Logistics/Depots (Tooele, Hawthorne (GOCO), Blue Grass, Anniston Munitions Center (MC), Letterkenny MC

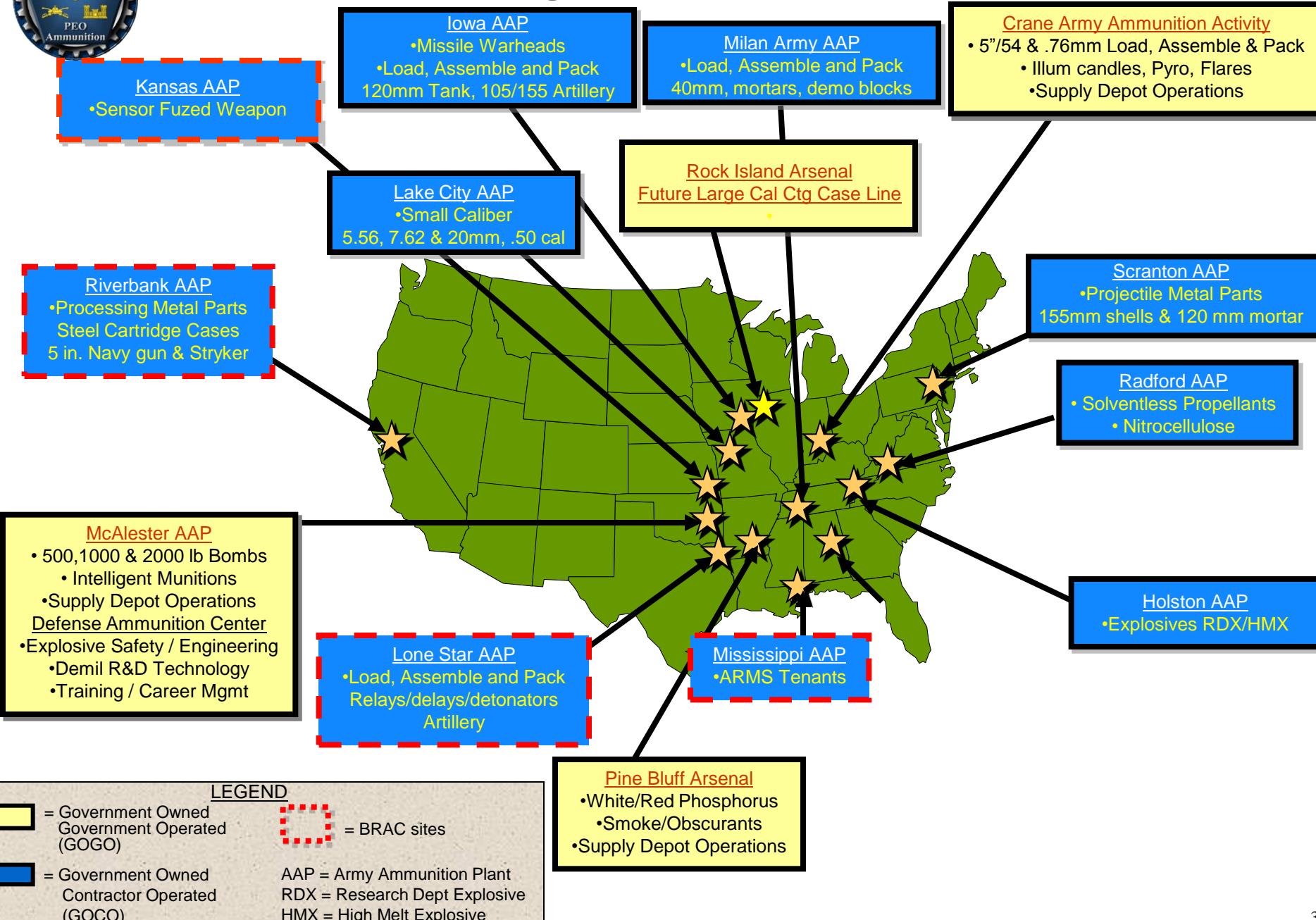
Typical Annual Funding Distribution



FY09:
\$4.1B



Current Organic Production Facilities





SMCA Ind Base Strategic Plan: 2015

January 2009

Vision



Mission

A World Class
Conventional Ammo Industrial Base

Meets Joint Warfighter's Requirements

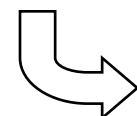
(Right Time – Right Place – Right Cost – Right Quality)

Business Tenets

BSC
Perspectives



Goals



Joint
Warfighter
Perspective

Finance
& Resource
Planning
Perspective

Process
Perspective

Communication,
Innovation &
Workforce
Perspective

Optimize
Production
Base
Readiness

Optimize
Depot
Logistics
Readiness

Reduce
Life
Cycle
Costs

Initiate
Innovative
Acquisition
Strategies

**Modernize
Industrial
Base
Capabilities**

Improve
Munitions
Supply Chain
Respon-
siveness

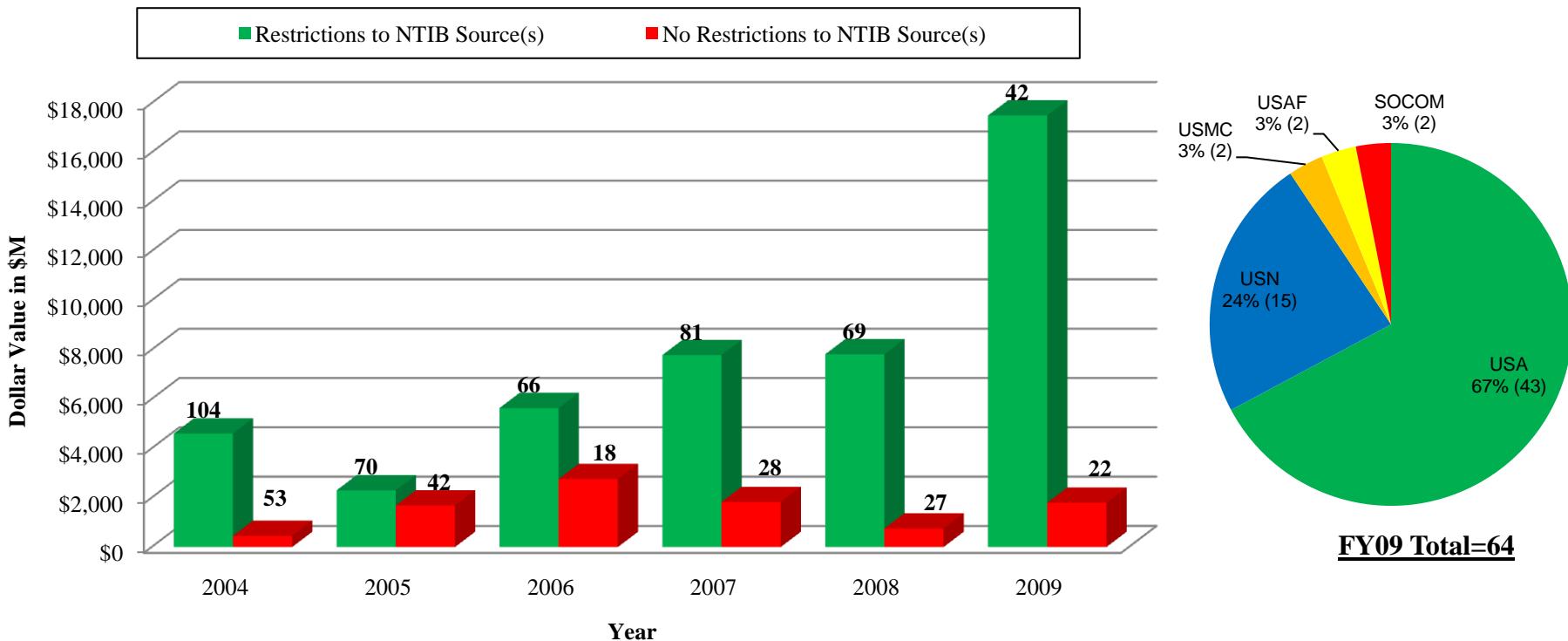
Recruit,
Train,
Retain
The Best
Workforce

Promote
Collabor'n,
Commo
throughout
the IB
Community

Supporting Objectives and Strategies



Public Law 105-261, Section 806: Statistics



[Link to request Section 806 "Watch List"](#)

https://www.fbo.gov/?s=opportunity&mode=form&id=f44f2858a9ab34d1baa498b6df20d380&tab=core&_cview=0



GOCO AAP Modernization Approach

SMCA DODI 5160.68

“Manage and Invest.....
To Ensure Adequate
Production Base that
Supports SMCA
Assigned Products”

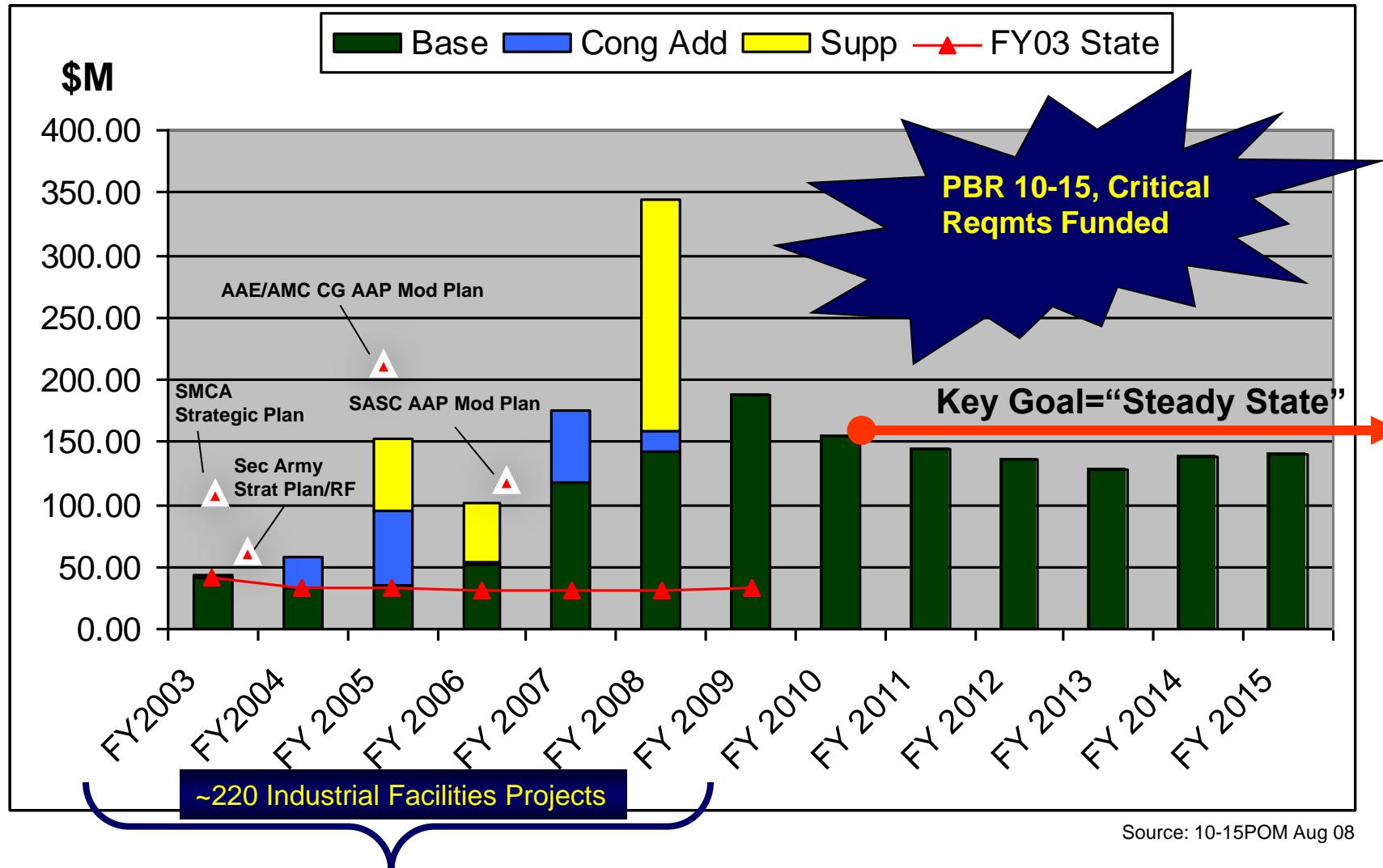


- **Implement SMCA Industrial Base Strategic Plan, Jan 2009, Goal 5: “Modernize Industrial Base Capabilities”**
 - ✓ **Objectives:**
 - Increase Manufacturing Readiness to Meet Current and Future Requirements
 - Reduce AAP Operating Costs & Footprint
 - Effectively and Efficiently Meet POM Requirements
 - ✓ **Key Modernization Strategies:**
 - Identify, consolidate and prioritize production & infrastructure deficiencies, aligning with Joint Warfighter needs
 - Target:
 - Post-BRAC AAPs: Radford, Lake City, Holston, Scranton, Iowa, Milan
 - Capabilities/Capacities Not Available or Insufficient in Commercial Sector
- **Emphasize “Critical” Modernization Requirements**
 - ✓ **Critical:** Investment Necessary to Avoid Significant Supply Disruptions or to Provide an Immediate and Essential Improvement to Operating Efficiencies. Includes Projects to Meet Specific Environmental Compliance Regulations and Safety/Security Standards.
 - Examples:
 - Power Plant EPA Compliance
 - New 5.56mm SCAMP Lines
 - New NC production
 - New Waster Water Treatment Plant
 - High Tonnage Press Rebuild
 - New Plant-wide Electrical Power System
 - ✓ **Total Requirement:** Includes Projects that are Necessary to Minimize Operating Costs, Reduce Operating Footprint, and Improve Operating Efficiencies.



GOCO AAP Industrial Facilities (IF) Funding

(Procurement of Ammunition, Army (PAA), EP 1200)



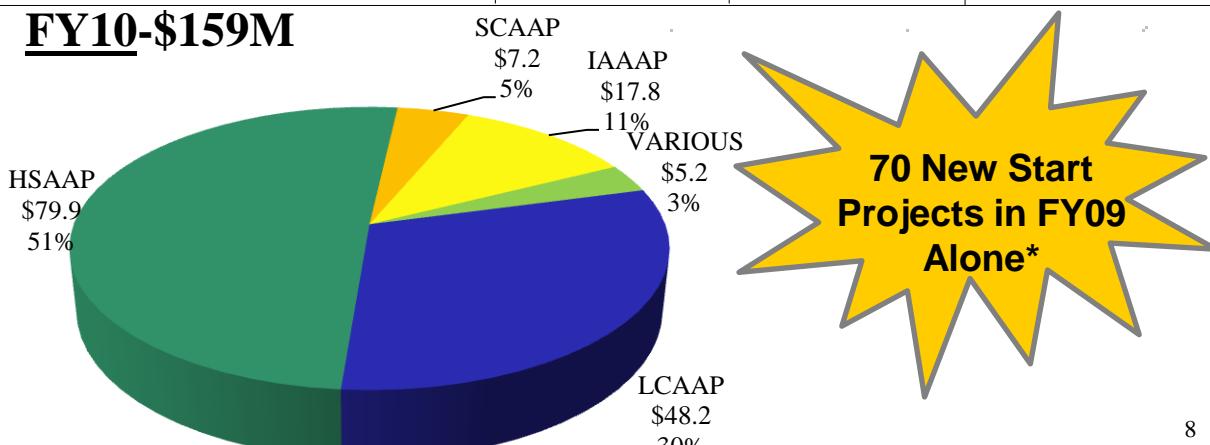
HQDA G8 Providing Tremendous Support



GOCO AAP Capability and Modernization Funding

GOCO Facility	Core Processes	FY03-09 Funding Totals	FY10-15 Critical Reqs (\$M)	FY10-15 Total Required (\$M)
Radford (VA)	Propellant Manufacturing (Rocket, Artillery, Tank, Med Cal; NC for all Propellants)	440.065	315.8	338.0
Lake City (MO)	Small Caliber	246.960	77.9	93.5
Holston (TN)	Explosives - HMX, RDX	200.390	300.4	300.4
Scranton (PA)	Large Caliber Metal Parts- Artillery/Mortars	51.441	40.7	44.2
Iowa (IA)	Load, Assemble & Pack (LAP) - Tank/Artillery, FASCAM	67.640	47.2	67.9
Milan (TN)	LAP - Mortars, 40mm Cartridges; C-4 Extrusion	20.362	3.0	3.0
Engr Support	Engineering Support/ATEC	21.547	43.3	43.3
	Total	1,048.405	828.3	890.3

All FY10-15 Critical Requirements are fully funded



Notes:

1. FY03-09 and FY10 data based on actual funding received
2. FY11 Data based on FY11 Press Bud as of 1 Feb 2010
3. FY12-15 Data based on projected requirements



Holston AAP Relocation of Area A to Area B



Area A buildings



Project Description:

- Relocate Area A acid operation to Area B, eliminating a 7 mile pipeline.

Performance Objectives/Benefits:

- reduce overall infrastructure footprint
- enhance operational safety and security
- reduce risk of production interruption
- save capital investment to modernize the Area A facilities

Contract Type: FFP

Cost ■ Schedule ■

Original Baseline \$ 141.60M 60mo (Mar 09 – Mar 14)

Current (EAC) \$ 139.20M 60mo (Mar 09 – Mar 14)

Funding Profile

	FY 09	FY10	FY11	Total
POM	\$12.00M	\$64.16M	\$65.44M	\$141.60M

Accomplishments

- Completed Project Integrated Master Plan & Schedule (Jun 2009)
- Completed Pre-Design phase (Dec 2009)
- D&F approved by OSD(AT&L) (Oct 2010)
- 30% Engineering Design Contract awarded (Completion Apr 2011)

Issues: None



Nitric Acid Concentrator/ Sulfuric Acid Concentrator (NAC/SAC) for Radford AAP

- **Purpose:** Construct a new state-of-the-art Nitric Acid Concentration/ Sulfuric Acid Concentration (NAC/SAC) Facility

- The current system:
 - ✓ Exceeds 20 year design life
 - ✓ Oversized by a factor of 2 and energy inefficient

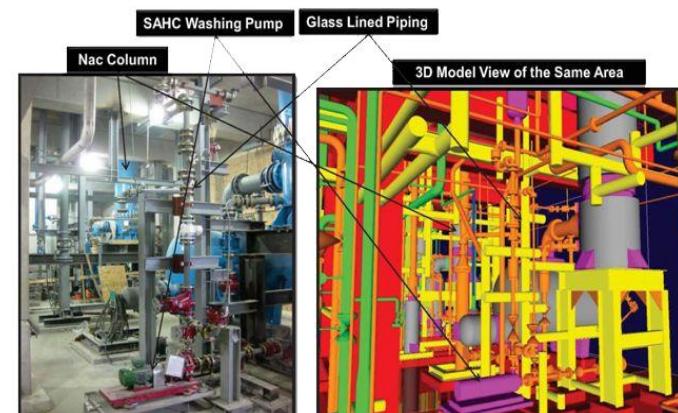
- **Cost & Schedule:**

Original Baseline	\$80.50M	48 months (Apr 06 – Mar 10)
Rev 1 (Jul 08)	\$118.78M	52 months (Apr 06 – Jul 10)
Current EAC	\$118.78M	52 months (Apr 06 – Jul 10)
SPI		
CPI		



- **Status/Milestones:**

- ✓ Contract awarded to SNC-Lavalin-Plinke by ATK (Oct 08)
- ✓ Air Permit :VA Department of Environmental Quality – Dec 08
- ✓ Building construction completed – Aug 09
- ✓ process equipment completed for 2nd thru 7th floors – Dec 09
- ✓ Glass-lined steel piping underway – to be completed Mar 10
- ✓ Commissioning: Apr-July 2010





Key Ammo Industrial Base Challenges

- AAP Modernization
 - ✓ Modernizing While Avoiding Supply Disruption
 - ✓ Right-sizing
- Cost of GOCO AAP Ownership
 - ✓ High Overhead Costs
 - ✓ Balancing Safety, Security and Production Sustainment Requirements w/ AAP Competitiveness
- “Soft Landing” Requirements & Resource Planning
 - ✓ Avoiding Abrupt and Large Reduction in Requirements
 - ✓ Sustaining commercial sub-tier supply chain
- Single Point Failure & “No NTIB Source of Supply” Risk Mitigation
 - ✓ E.g., TATB, Lead Azide, Calcium Silicide
- Factoring Industrial Base Considerations into the Acquisition Process
 - ✓ Manage Impacts to Critical NTIB Core Competencies, Capabilities & Capacities



BACK UP



SMCA Industrial Base Strategic Plan: 2015

Army Campaign Plan Imperatives
Sustain, Prepare, Reset & Transform



JM&L LCMC Strategic Priority #1



Achieve Optimal Ammo Industrial Base Readiness



Single Manager for Conventional Ammunition (SMCA)
Industrial Base Strategic Plan: 2015



“Super Seven” Business Tenets

1. Acquisitions and investments will be synchronized to ensure that required manufacturing and logistics competencies and capabilities remain available and viable.
2. Industrial base considerations will be factored into the acquisition process. Product will bear organic base operation and maintenance cost, to maximum extent practicable.
3. The industrial base infrastructure will be sized to maximize operating efficiencies and to reflect strategic guidance and economic realities.
4. Private industry, as the principal ammunition supplier, will be provided incentives for investing in and sustaining the production base.
5. Systems acquisition will be utilized to the maximum extent practicable.
6. Opportunities will be identified and implemented for greater joint Service activities.
7. The culture of continuous improvement will influence all SMCA and industrial base related strategies and subsequent activities.